

Nov. 20, 1945.

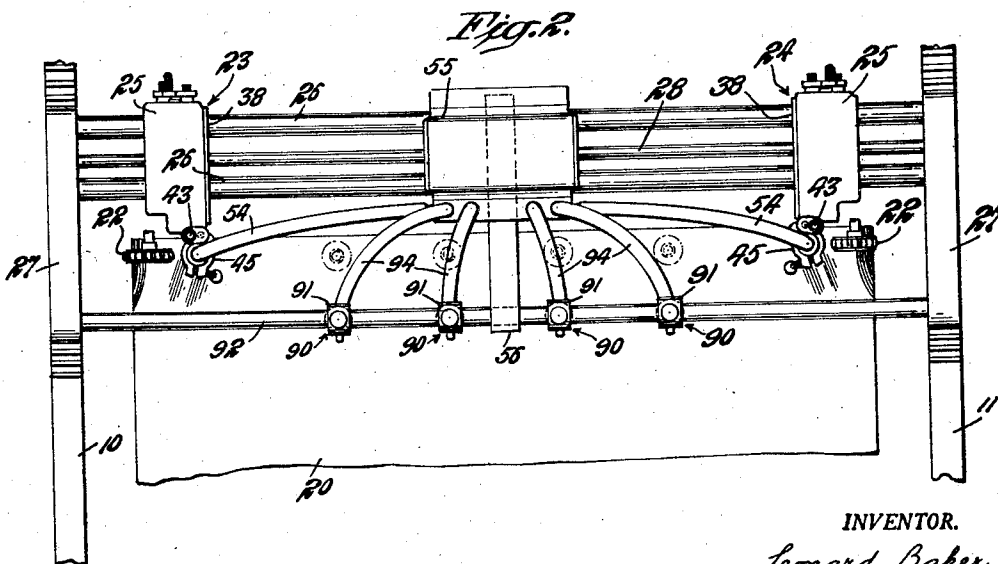
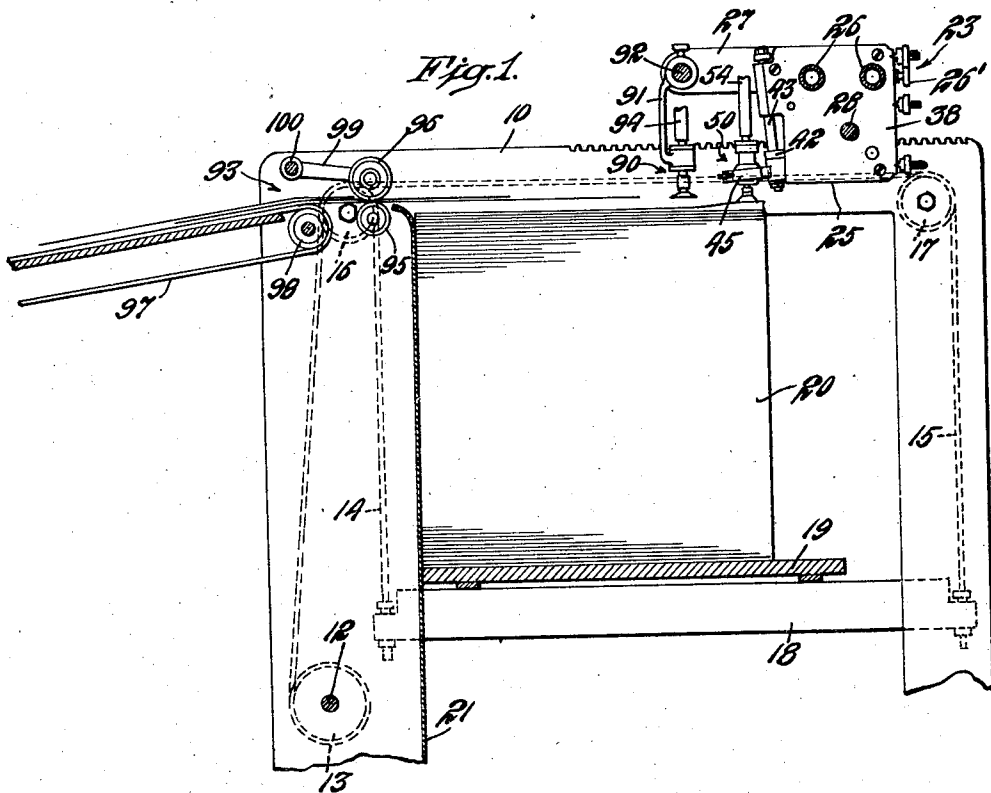
L. BAKER

2,389,480

SHEET FEEDING APPARATUS

Filed Aug. 12, 1944

3 Sheets-Sheet 1



INVENTOR.

Leonard Baker

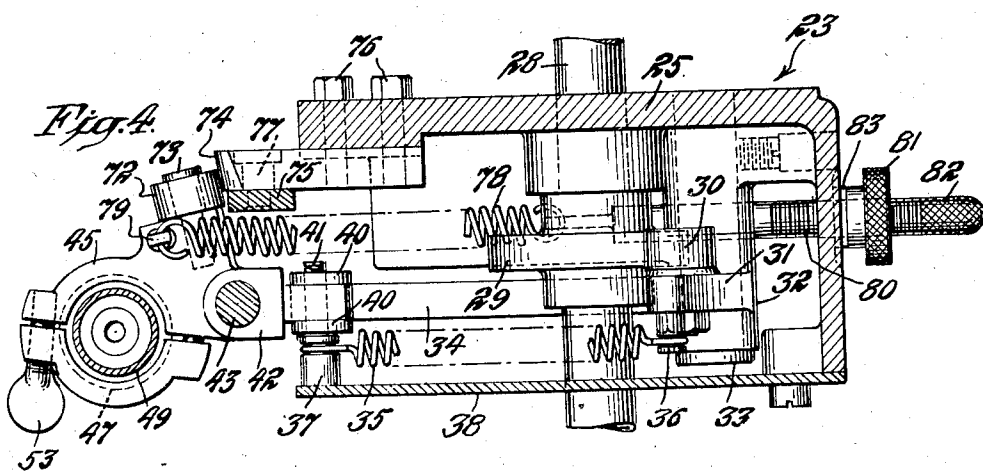
BY

F. Bascom Smith
ATTORNEY

2,389,480

Filed Aug. 12, 1944

3 Sheets-Sheet 2



Leonard Baker.

F. Bascom Smith
ATTORNEY

UNITED STATES PATENT OFFICE

2,389,480

SHEET FEEDING APPARATUS

Leonard Baker, Hillsdale, N. J., assignor to Dexter Folder Company, Pearl River, N. Y., a corporation of New York

Application August 12, 1944, Serial No. 549,145

15 Claims. (Cl. 271—26)

This invention relates to sheet feeders and while capable of general use is more particularly adapted for embodiment in types of feeders known as "stream feeders" wherein the sheets are advanced in lapped relation from a supply to a printing press or other instrumentality with which the feeder is associated.

One object of the present invention is to provide an improved stream feeder which will efficiently feed sheets one after another from a supply and present said sheets in proper lateral position to conveying means for movement by the latter in lapped relation to a printing press or other machine.

Another object of the invention is to provide an improved sheet feeder wherein successive sheets are lifted from a supply and stretched transversely by two suction devices so controlled that the stretching of each sheet may be effected solely by one or the other of said devices, or by both of said devices through equal or unequal outward relative movements of the latter.

A further object is to provide novel means for controlling the relative lateral position of successive sheets on conveying means through stretching of each sheet in a direction transversely to the feeding direction prior to presentation of the sheet to said conveying means by sheet forwarding devices.

The above and further objects and novel features of the present invention will more fully appear from the following detail description which is to be read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration only, and are not intended as a definition of the limits of the invention, reference for this latter purpose being had primarily to the appended claims.

In the drawings, wherein like reference characters refer to like parts throughout the several views,

Fig. 1 is a vertical longitudinal sectional view of a sheet feeder embodying the present invention;

Fig. 2 is a fragmentary top plan view of the feeder shown in Fig. 1;

Fig. 3 is an enlarged vertical longitudinal sectional view of one of the sheet lifting and stretching mechanisms shown in Fig. 2;

Fig. 4 is a horizontal sectional view on the line 4—4 of Fig. 3;

Fig. 5 is a vertical sectional view on the line 5—5 of Fig. 3;

Fig. 6 is a rear elevation illustrating diagram-

matically the position of a lifted sheet after it is stretched transversely through equal outward movements of the suction devices;

Fig. 7 is a view similar to Fig. 6 but illustrating diagrammatically the position of a lifted sheet after it is stretched transversely by one of the suction devices only; and

Fig. 8 is a view similar to Fig. 6 but illustrating diagrammatically the position of a lifted sheet after it is stretched transversely through unequal outward movements of the suction devices.

Referring to the drawings, 10 and 11 indicate the side frames of a feeder on which are mounted the various movable parts of the feeder, as well as certain stationary parts thereof. Journalled in suitable bearings in frames 10, 11, is a transversely extending shaft 12 having fixed on each end thereof a winding drum 13 (Fig. 1). Secured to each drum 13 and extending upwardly therefrom at opposite sides of the feeder are cables 14 and 15 which pass over sheaves 16 and 17 journalled on frames 10, 11. From sheaves 16, 17, the cables 14, 15 extend downwardly and have their free ends secured to the side bars 18 of a pile elevator including said cables. Side bars 18 are adapted to receive and support a pile board 19 and a pile of paper sheets 20.

The elevator may be lowered to load it, and raised to bring the top of the pile to proper feeding position by any suitable means for these purposes. Shaft 12 is then intermittently rotated in the usual manner by any well-known means to maintain the top of the pile at the proper level as the sheets are fed therefrom in succession by means for this purpose hereinafter described. During step by step upward movement of the elevator, the front of the pile is guided by an apron or plate 21 (Fig. 1) secured in any suitable manner to frames 10, 11. The construction of the pile elevator and its operation for loading and feeding purposes are well understood in the art and since the elevator per se forms no part of the present invention, further description thereof is unnecessary.

The sheets of pile 20 are lifted from said pile one after another at the rear opposite corners thereof by sheet lifting mechanisms to be later described, but before this operation takes place, the upper rear corner portions of the sheets are preferably preliminarily separated to ensure that the top sheet alone is lifted from the pile by said mechanisms. This preliminary separation of the sheets may be effected by any means for this purpose, and that particularly illustrated herein comprises a pair of comber wheels 22 (Figs. 2, 6,

7 and 8) which are rotated to frictionally engage the rear opposite corner portions of the topmost sheet on the pile and move said portions inwardly toward each other whereby small buckles or humps are formed in said sheet adjacent said corners. The construction and operation of the comb wheels 22 is the same as the construction and operation of the comb wheels disclosed in the United States Patent No. 2,108,702, granted February 15, 1938, to Headley Townsend Backhouse, therefore needing no further detail description herein.

After preliminary separation of the top sheet has been effected at its rear opposite corners, the sheet is lifted from the pile and stretched in a direction transversely to the feeding direction by two sheet lifting and stretching mechanisms located above the upper rear corner portions of the pile of sheets 20. The stretching of the sheet straightens and raises its entire rear edge for engagement by sheet forwarding devices, said stretching operation being also utilized in a novel manner to ensure that the sheet, when transferred to the forwarding devices, is in proper lateral position for accurate presentation thereby to conveying means. These sheet lifting and stretching mechanisms, indicated generally at 23 and 24, are constructed one right-hand and the other left-hand, and since the constructions of said mechanisms are otherwise identical, a description of one will suffice for both.

Each sheet lifting and stretching mechanism is carried in a housing 25 (Fig. 3) slidably mounted on a pair of hollow cross shafts 26 to enable adjustment of each mechanism transversely of the feeder to accommodate sheets of different widths, each housing being secured in various positions of adjustment by a clamp screw 26'. Shafts 26 are secured at their opposite ends in brackets 27 (Figs. 1 and 2) which are slidably mounted on frames 10, 11 to enable adjustment of the sheet lifting and stretching mechanisms 23, 24 longitudinally of the feeder as a unit to accommodate sheets of different lengths.

Extending transversely of the feeder through housings 25 and journaled in suitable bearings in said housings and in brackets 27 is a cam shaft 28 which is driven in any suitable manner from the printing press or any other suitable source of power to make one revolution for each cycle of operation of the feeder. Keyed to cam shaft 28 and disposed within each housing 25 is a cam 29 (Figs. 3 and 4) which engages a roller 30 journaled on one arm 31 of a bell crank lever 32 pivoted at 33 on said housing and provided with a forwardly extending arm 34. Roller 30 is biased toward cam 29 by a pull spring 35 having one end connected at 36 with the upper end of arm 31 and the opposite end connected at 37 with a cover plate 38 removably bolted to the inner side of housing 25.

Pivotally connected at 39 on the forward end of bell crank arm 34 are the lower ends of links 40 the upper ends of which are pivotally connected at 41 with a block 42 (Figs. 3 and 4). The latter is brazed or otherwise suitably secured adjacent the lower end of a rod 43 inclined upwardly and forwardly at a slight angle and guided for vertical sliding movement in a suitable opening 44 (Fig. 5) formed in housing 25. Pivotally mounted on rod 43 beneath block 42 to swing in a horizontal plane relative to said rod is a bracket 45 (Figs. 3, 4 and 5) which is retained on rod 43 for vertical movement therewith by a nut 46 threaded and pinned to the lower end of said rod,

Bracket 45 is formed with a socket 47 to receive a ball 48 formed integrally with the cylinder 49 of a suction sheet gripping and lifting device 50. The latter includes a hollow piston stem 51 projecting downwardly beyond the lower end of cylinder 49 and has fixed thereon a rubber suction cup 52 communicating with said stem and said cylinder. Stem 51 and cup 52 are actuated downwardly by a spring (not shown), and are actuated upwardly by vacuum when said cup has gripped and is sealed by a sheet. Ball and socket connection 47, 48 enables adjustment of the suction device 50 to any desired angle for a more effective and accurate gripping of the separated portion of the sheet by cup 52, said device being held in various positions of adjustment by a clamp screw 53.

Vacuum is created in the suction devices 50 at predetermined intervals through flexible conduits 54 having corresponding ends connected with the cylinders 49 and opposite ends connected with the vacuum side of a rotary valve mechanism 55 (Fig. 2). The latter is bolted to a center bracket 56 which, in turn, is bolted to shafts 26. Valve mechanism 55 is of the general type disclosed in the United States Patent No. 2,333,934, granted March 4, 1941, to Headley Townsend Backhouse, and needs no detail description herein, except to say that said mechanism is connected with a vacuum pump (not shown) through one of the hollow shafts 26, and is driven in any suitable manner from cam shaft 28 to control the making and breaking of vacuum in the cylinders 49, and in suction sheet forwarding devices to be hereinafter described.

With the construction thus far described, the suction devices 50 will be lowered by the springs 35 and raised by the cams 29 at intervals and such that following preliminary separation of the opposite rear corner portions of the top sheet, the cups 52 will, upon creation of vacuum in the cylinders 49, grip the inwardly combed humped portions of said sheet and further separate them through retraction of stems 51 into said cylinders. Thereupon the suction devices 50 are moved upwardly and forwardly, due to the inclination of guide rod 43, to lift the sheet at its rear edge, and at the same time exert a forward pushing action on the sheet so that it is held against the plate 21 and prevented from moving rearwardly.

Novel means are provided for controlling the extent of downward movement of the suction devices 50 so that the cups 52 will engage the humped corner portions of the sheets at their separated levels and not depress said portions back onto the pile. In this manner lifting of the top sheet alone by the suction devices 50 is further ensured. As herein shown, the extent of downward movement of each suction device may be varied while the feeder is in operation, thus avoiding loss of time and production, and is preferably accomplished by means comprising a bell crank lever 57 (Fig. 3) having a vertically extending arm 58 and a forwardly extending arm 59. Lever 57 is disposed within housing 25 and pivotally mounted on a stub shaft 60 secured in said housing. The forward end of bell crank arm 59 engages the lower end of a pin 61 which is slidably mounted in a suitable opening 62 (Figs. 3 and 5) formed in housing 25 and to one side of opening 44 for guide rod 43. Pin 61 is disposed in the path of downward movement of a stop plate 63 which is threaded on the upper end of guide rod 43 and is retained on said rod by a lock nut 64. Pivotally connected at 65 on the upper end of bell

crank arm 58 is one end of a horizontal spring pressed rod 66, the opposite end of which extends through a suitable opening formed in the rear wall of housing 25 and has threaded thereon an adjusting nut 67. The spring 68 for rod 66 is mounted thereon between a bushing 69 carried in housing 25 and a collar 70 secured to said rod. The suction device 50 is shown in Fig. 3 in its lowermost position, and upon rotation of adjusting nut 67 in the proper direction the bell crank lever 57 will be rotated clockwise (Fig. 3) and thereby raise pin 61 relative to housing 25 to stop the suction device 50 in any desired downward position through engagement of stop plate 63 with said pin. Lever 57 is maintained in adjusted positions through the tension of spring 68 and by teeth 71 formed on nut 67 and engaging in depressions formed in housing 25.

Novel means are provided for moving the suction devices 50 outwardly toward the sides of the pile of sheets 20 to transversely stretch the entire rear edge portion of the sheet during lifting of said sheet by said devices, and for controlling said stretching operation in a manner such that it may be effected solely by one or the other of the suction devices, or by both of said suction devices through equal or unequal outward movements of the same. As herein shown, said means for each suction device 50 preferably comprise a roller 72 (Figs. 3 and 4) journaled at 73 on bracket 45 and adapted to engage a fixed cam member 74 and a movable cam member 75 (Figs. 3, 4 and 5). Cam member 74 is disposed at right angles to the inclined axis of guide rod 43, and is secured as by bolts 76 to housing 25, and cam member 75 is pivotally mounted at 77 on cam member 74 and so located that it provides an upwardly extending continuation of the latter.

Roller 72 is biased toward cam members 74, 75 by a pull spring 78 (Figs. 3 and 4) having one end connected at 79 to bracket 45. The opposite end of spring 78 is connected to one end of a screw threaded rod 80 which extends loosely through a suitable opening formed in the rear wall of housing 25 and has threaded thereon an adjusting nut 81. The outer end of rod 80 is knurled as indicated at 82 to enable holding of said rod against rotation when nut 81 is rotated to increase or decrease the tension of spring 78, which adjustment may be made while the feeder is in operation. Rod 80 is held in adjusted position by the tension of spring 78 and by teeth 83 formed on nut 81 and engaging in depressions formed in housing 25.

Pivotally connected at 84 on the upper end of cam member 75 is one end of a spring pressed rod 85 (Fig. 3), the opposite end of which extends horizontally through a suitable opening formed in the rear wall of housing 25 and has threaded thereon an adjusting nut 86. The spring 87 for rod 85 is mounted thereon between housing 25 and a collar 88 secured to said rod. Cam member 75 may thus be adjusted on its pivot 77 toward and away from roller 72 through rotation of nut 86 in opposite directions to control the outward movement of suction device 50 by spring 78, which adjustment may be made while the feeder is in operation. Cam member 75 is held in various positions of adjustment through the tension of spring 87 and by teeth 89 formed on nut 86 and engaging in depressions formed in housing 25. The normal position of cam member 75 is as shown in full lines in Fig. 3.

When the suction devices 50 are moved downwardly as hereinbefore described, rollers 72 will

move downwardly along the upwardly and rearwardly inclined cam members 75 and into engagement with cam members 74, causing said suction devices to swing inwardly toward each other during said downward movement to proper positions for gripping of the inwardly combed humped corner portions of the top sheet on the pile by the suction cups 52. When the sheet is gripped by cups 52, the suction devices 50 are raised to lift the sheet, whereupon the rollers 72 will ride off cam members 74 and move toward cam members 75, whereupon the suction devices are swung outwardly away from each other by the action of springs 78, thereby stretching the entire rear edge portion of the sheet through equal outward movements of said suction devices, as indicated diagrammatically in Fig. 6, to an extent depending on the slack or sag in the sheet, the tension of springs 78 being so adjusted to effect the stretching operation and yet not cause the suction devices to tear or slip on the sheet.

After the sheet is gripped, lifted and stretched by the suction devices 50 as hereinbefore described, said sheet is transferred to sheet forwarding devices which may be of any type, but as herein shown are of the suction type and indicated generally at 90 (Figs. 1 and 2). These suction sheet forwarding devices 90 are located at the rear of the feeder and are carried in arms 91 fixed on a transverse shaft 92 journaled in suitable bearings in the brackets 27 and 56. Shaft 92 is rocked by any suitable means for this purpose, and so timed that the forwarding devices 90 are moved rearwardly, as indicated in broken lines in Fig. 2, to grip the lifted sheet in the region of the stretched portion thereof, whereupon said sheet, being released by the suction devices 50, is then forwarded by the forwarding devices from the pile and delivered under and in lapped relation with a preceding sheet to conveying means indicated generally at 93. The forward movement of the sheet is assisted by air blasts directed forwardly under the lifted sheet through blow pipes (not shown) which act to completely separate the sheet from the pile and float said sheet in a forward direction as well understood in the art. After the sheet is delivered to the conveying means 93 by the forwarding devices 90, the latter are released from the sheet and returned rearwardly for action on the next lifted and stretched sheet.

The making and breaking of vacuum in the sheet forwarding devices 90 is effected at proper intervals by the rotary valve mechanism 55, and for this purpose the sheet forwarding devices have connected therewith corresponding ends of flexible conduits 94 the opposite ends of which are connected with the vacuum side of said valve mechanism.

The conveying means 93 comprise a feed roller 95 and pressure rollers 96 cooperating with said feed roller to receive the forwarded sheets in lapped relation and feed a stream of the lapped sheets on to a plurality of tapes 97 that advance the stream of lapped sheets to the printing press or other machine which takes the leading sheets successively from the stream and acts upon them in like manner to print or otherwise treat and deliver them. The front ends of the tapes 97 pass around a suitable roller (not shown) adjacent the printing or other machine, and the rear ends of said tapes pass around a roller 98. The latter and the feed roller 95 are journaled in suitable bearings in frames 10, 11 and are driven continuously and at slow speed

by any suitable source of power connected therewith. Pressure rollers 96 are journaled on arms 99 adjustably secured on a cross shaft 100 having its opposite ends fixed in frames 10, 11.

In the event the sheets, when delivered to the conveying means 93 by the sheet forwarding devices 90, are not in proper lateral position on said conveying means for further action thereon, due to improper piling of the sheets on the elevator or improper location of the pile in the feeder, said inaccuracy may be quickly and conveniently rectified with respect to succeeding sheets while the feeder is in operation through controlling the stretching of said sheets by the suction devices 50. For example, if a sheet is presented to the conveying means 93 so that it is off-side to the left as viewed standing at the rear of the feeder, in this case the cam member 75 of the sheet lifting and stretching mechanism 24 is adjusted by the adjusting nut 86 to the dotted line position shown in Fig. 3 to bring said member into vertical alignment with cam member 74, thereby preventing outward movement of the suction device 50 of mechanism 24 and rendering said device ineffective to stretch the sheet. Under these conditions, when the suction devices 50 are raised with a gripped sheet the stretching of the sheet is effected solely by the suction device 50 of mechanism 23 with the result that said sheet will be shifted laterally toward the right as indicated diagrammatically in Fig. 7 and represented therein by the dimension A, the tension of the springs 78 of both suction devices 50 being correspondingly increased, if necessary, to enable the one suction device 50 to stretch the sheet, and to prevent movement of the other suction device 50 with the sheet. The sheet forwarding devices 90 will then grip the sheet at its shifted position and thus present said sheet in proper lateral position to the conveying means 93.

The extent of lateral shifting movement of the sheet toward the right, as previously described, may be varied, as required, in accordance with the positions of the sheets on the pile, by adjusting the cam member 75 of the mechanism 24 to various positions between the dotted line position and the full line position shown in Fig. 3. Stretching of the sheet will then be effected by both suction devices 50 but through unequal outward relative movements of the latter, as indicated diagrammatically in Fig. 8, the suction device 50 of mechanism 24 moving outwardly an extent less than the suction device 50 of the mechanism 23, thereby decreasing the extent of lateral movement of the sheet toward the right, as represented by the dimension B in Fig. 8, dependent on the position of cam member 75 of mechanism 24.

The above described operations for stretching and shifting the sheets laterally apply equally to both suction devices 50, whereby each successive sheet may be lifted, stretched and shifted toward the right or the left to position said sheets for presentation by the sheet forwarding devices in proper position on the conveying means. Further, the sheet stretching action of both suction devices 50 may be dispensed with, as when handling cardboard or other stiff material in which case it is neither necessary nor desirable, by adjusting the cam members 75 of both mechanisms 23 and 24 to the dotted line position shown in Fig. 3.

There is thus provided a more efficient and flexible sheet feeder wherein the various sheet

handling operations, such as the gripping, lifting and stretching of each successive sheet, may be controlled while the feeder is in operation to insure accurate feeding of the sheets one after another from the pile and accurate presentation of the sheets to conveying means at all times, thus eliminating frequent stopping of the feeder to make adjustments or to remove misfed sheets, resulting in a greater increase in output of fed sheets.

While one embodiment of the present invention has been illustrated and described in the foregoing specification, it is to be expressly understood that changes may be made therein particularly in the design and arrangement of the parts illustrated, without departing from the spirit and scope of the invention, as will now be clear to those skilled in the art. For example, the suction sheet lifting and stretching mechanisms may be redesigned and arranged for embodiment in continuous types of feeders wherein the sheets are fed in successive order from a bank of sheets. For a definition of the limits of the invention, reference is had primarily to the appended claims.

What is claimed is:

1. In a sheet feeder, a pair of suction devices arranged above a supply of sheets and mounted for movement toward and away from said supply to grip the topmost sheet at transversely spaced points and lift said sheet from the supply, means for moving said suction devices toward and away from the supply, means for moving said suction devices laterally away from each other while gripping the sheet to stretch the latter, and means for controlling the extent of lateral movement of said suction devices independently of each other.

2. In apparatus of the class described, a pair of transversely spaced suction devices, means mounting said suction devices for movement toward and away from a supply of sheets to grip the topmost sheet at opposite corner portions thereof and lift said sheet from said supply and for movement laterally in opposite directions to stretch the gripped sheet, means for moving said suction devices toward and away from said supply, means for moving said suction devices laterally in opposite directions, and means for rendering one of said suction devices ineffective to stretch the sheet whereby stretching of the sheet is effected solely by the other of said suction devices.

3. Mechanism for lifting sheets one after another from a supply of sheets comprising two suction devices operable to grip each successive sheet at opposite corner portions thereof, means for moving said suction devices outwardly while gripping a sheet to stretch the latter, and means for controlling said outward movement of said suction devices so that the stretching of the sheet may be effected solely by either one of said suction devices or by both of said suction devices through equal or unequal outward movements of the latter.

4. In a sheet feeder, a suction device, means mounting said suction device for movement in opposite directions across a supply of sheets, resilient means for moving said suction device in one of said directions, cam means for moving said suction device in the other of said directions, and means mounting said cam means for movement to various positions to control the movement of said suction device by said resilient means.

5. In apparatus of the class described, a suc-

tion device, means for moving said suction device downwardly and upwardly into and out of engagement with the top of a supply of sheets, means for moving said suction device outwardly during upward movement thereof, and means operable while said suction device is in motion for varying the extent of outward movement thereof.

6. In a sheet feeder, a suction device, means for moving said suction device downwardly and upwardly into and out of engagement with the top of a supply of sheets, means operable while said suction device is in motion for varying the extent of downward movement thereof, means for moving said suction device outwardly during upward movement thereof, and means operable while said suction device is in motion for varying the extent of outward movement thereof.

7. In sheet feeding apparatus, a suction device, means for moving said suction device toward and away from the top of a supply of sheets, means mounting said suction device for inward and outward movements during movement of the same toward and away from the supply, respectively, spring means for moving said suction device outwardly, cam means comprising a fixed member and a movable member for moving said suction device inwardly, and means for adjusting said movable member to various positions to control the extent of outward movement of said suction device by said spring means.

8. In apparatus of the class described, a suction device, means for moving said suction device toward and away from the top of a supply of sheets, means mounting said suction device for movement outwardly during movement of the same away from said supply, a spring for moving said suction device outwardly, means operable while said suction device is in motion for varying the tension of said spring, a cam for controlling the outward movement of said suction device by said spring, and means operable while said suction device is in motion for moving said cam to one position to hold said device against movement by said spring and to other positions to vary the extent of movement of said suction device by said spring.

9. The method of lifting sheets one after another from a supply of sheets and positioning each sheet for further handling thereof, which comprises gripping each sheet at opposite corner portions, lifting the sheet from the supply by said corner portions, and moving said corner portions outwardly unequal distances to stretch the sheet between said corners and bring a side edge thereof beyond the adjacent side of the supply.

10. The method of lifting sheets one after another from a supply of sheets and positioning each sheet for further handling thereof, which comprises gripping the sheet by suction at opposite corner portions, lifting the sheet while it is gripped from the supply, and moving either one of said corner portions of the sheet outwardly while it is gripped to stretch the sheet between the corners thereof and bring a side edge of the sheet beyond the adjacent side of the supply.

11. The method of feeding sheets one after another from a supply thereof to conveying means,

which comprises gripping each sheet at opposite corner portions, lifting the sheet from the supply by said corner portions, moving said corner portions outwardly unequal distances to stretch the sheet between said corners and shift a side edge thereof laterally beyond the adjacent side of the supply, and gripping the stretched and shifted sheet at its stretch portion and forwarding the same to said conveying means.

12. The method of feeding sheets one after another from a supply thereof to conveying means, which comprises gripping each sheet by suction at its opposite rear corner portions, lifting the sheet from the supply while gripped, moving either one of said corner portions of the sheet outwardly while it is gripped to stretch the rear edge of the sheet and to shift a side edge thereof beyond the adjacent side of the supply, and gripping the stretched and shifted sheet at its stretched rear edge and forwarding said sheet to said conveying means.

13. In a sheet feeder, the combination of two suction devices arranged above opposite corner portions of a supply of sheets and movable toward and away from said supply to grip and lift the topmost sheet from the supply, means for moving said suction devices toward and away from said supply, means for moving said suction devices laterally away from each other while gripping the sheet to stretch the portion of the latter between said suction devices, means for controlling the extent of lateral movement of said suction devices independently of each other, and means for gripping the sheet in the region of the stretch portion thereof and forwarding said sheet from the supply.

14. In apparatus of the character described, the combination of two suction devices arranged above a supply of sheets and movable toward and away from said supply to grip the topmost sheet at opposite corner portions thereof and lift said sheet from the supply, means for moving said suction devices toward and away from the supply, means for moving said suction devices laterally in opposite directions while gripping the sheet to stretch the portion of the latter between said suction devices, means for rendering either one of said suction devices ineffective to stretch the sheet whereby stretching of the sheet is effected solely by the other of said suction devices, and means for gripping the sheet in the region of the stretch portion thereof and forwarding said sheet from the supply.

15. In a sheet feeder, a suction device, means including a guide rod for moving said suction device downwardly and upwardly into and out of engagement with the top of a supply of sheets, a pin disposed in the path of downward movement of said guide rod for limiting the downward movement of said suction device, and means operable while the suction device is in motion for moving said pin to various positions to vary the extent of downward movement of said suction device.

LEONARD BAKER.