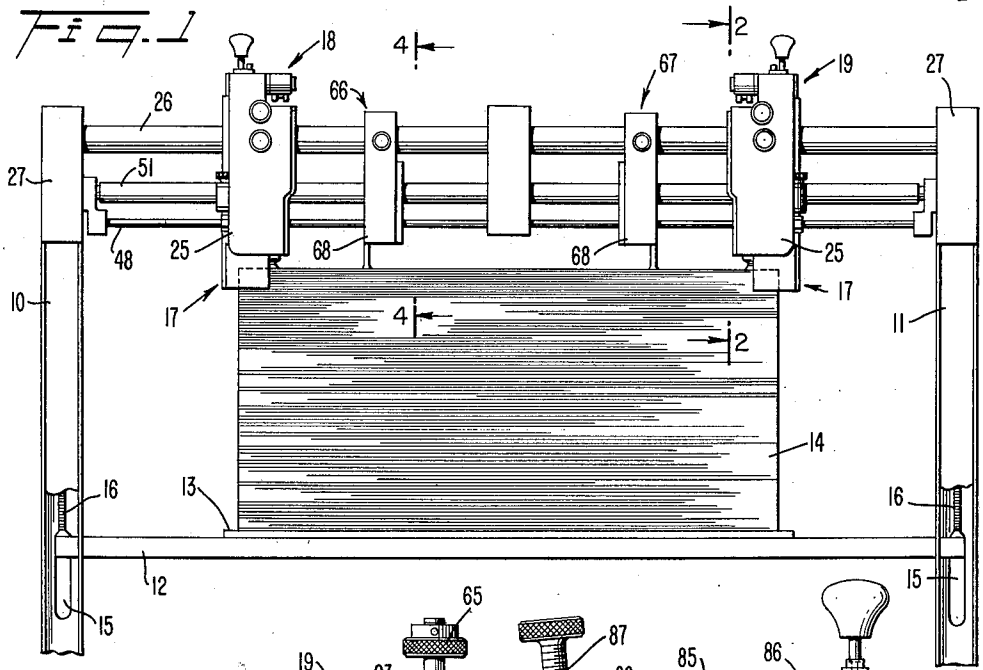
Jan. 1, 1963 J. R. WICKLAND 3,071,371

SHEET FEEDING APPARATUS

Filed Dec. 7, 1960 4 Sheets-Sheet 1

Fig. 1



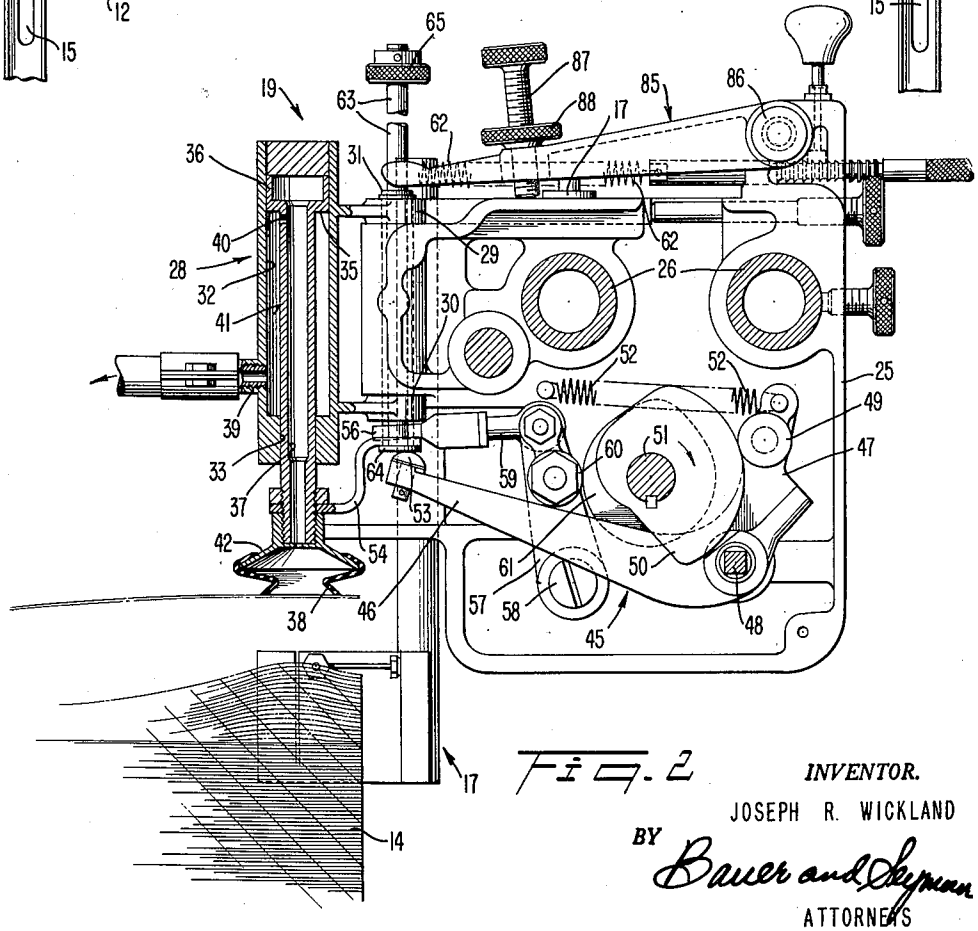




Fig. 2

INVENTOR.
JOSEPH R. WICKLAND
BY Bauer and Seyman
ATTORNEYS

Jan. 1, 1963 J. R. WICKLAND 3,071,371

SHEET FEEDING APPARATUS

Filed Dec. 7, 1960 4 Sheets-Sheet 2

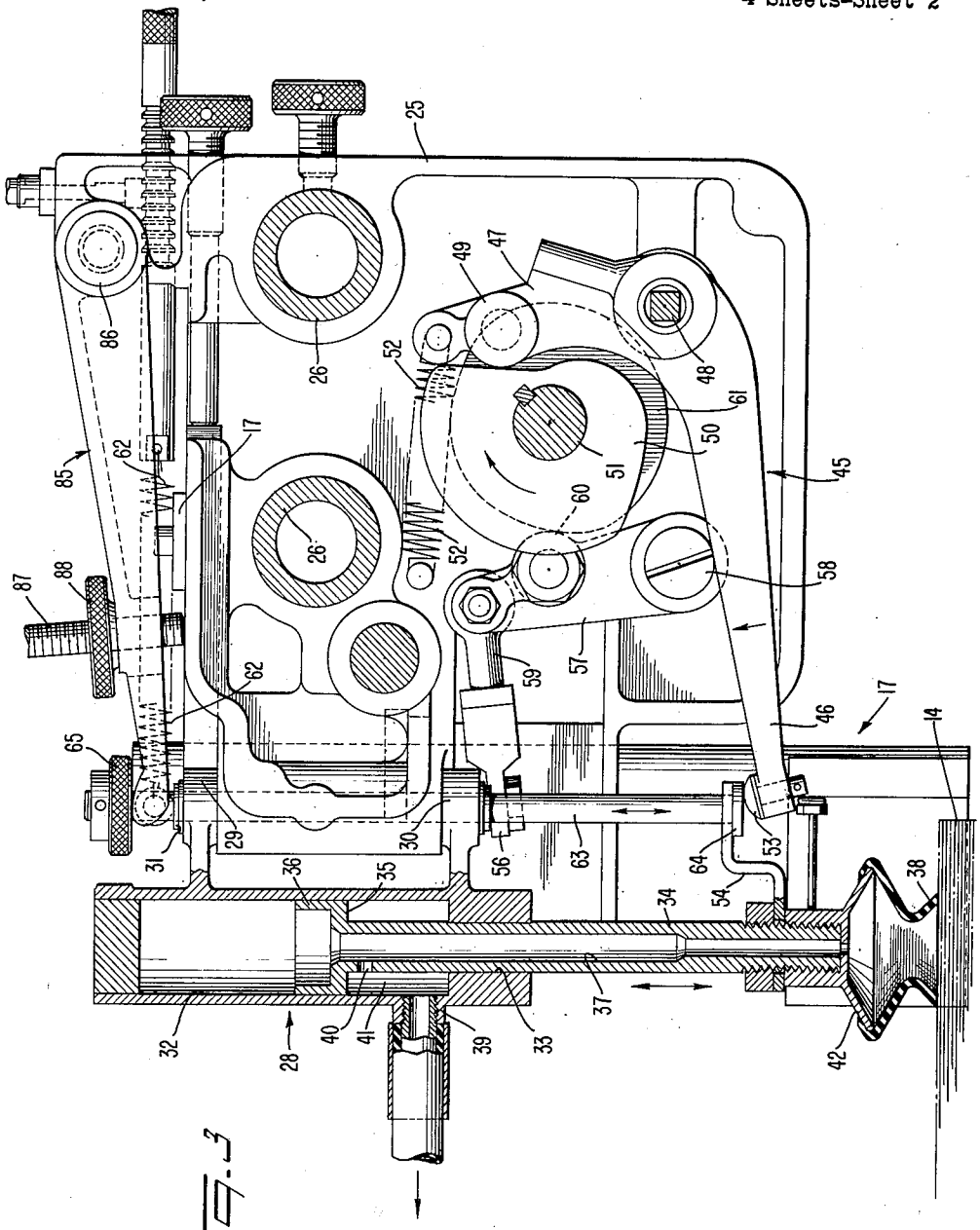



FIG. 3

INVENTOR.
JOSEPH R. WICKLAND

BY Bauer and Seppiaan
ATTORNEYS

Jan. 1, 1963 J. R. WICKLAND 3,071,371

SHEET FEEDING APPARATUS

Filed Dec. 7, 1960 4 Sheets-Sheet 3

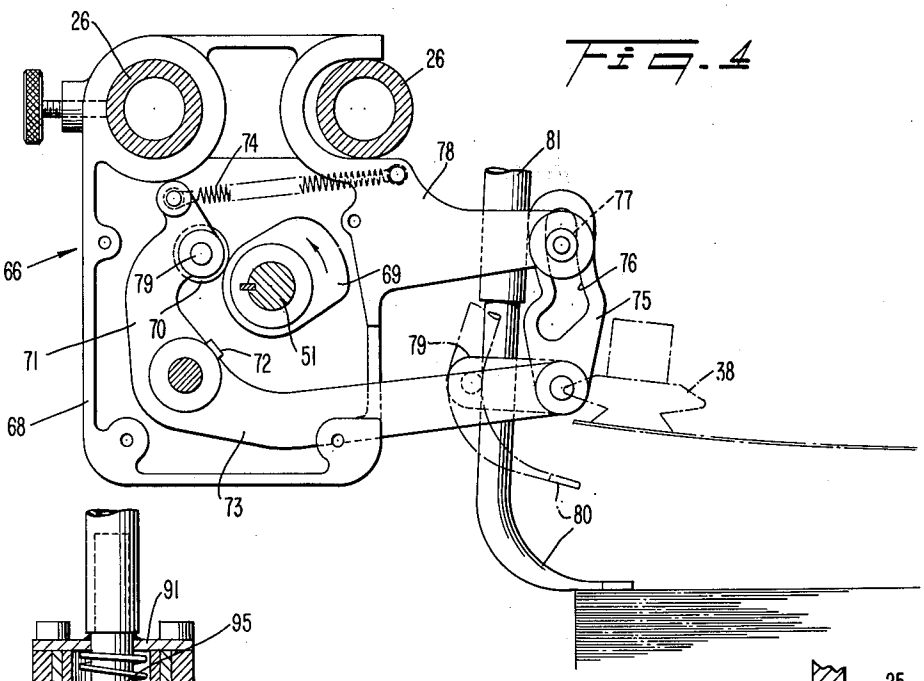



Fig. 4

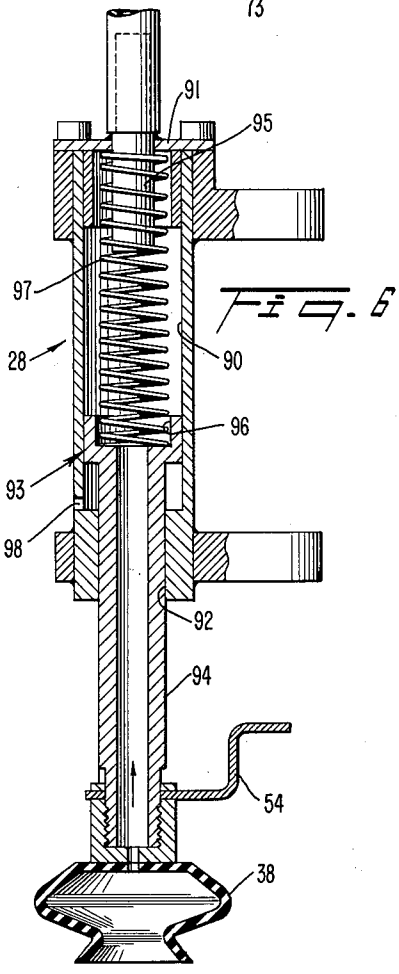



Fig. 6

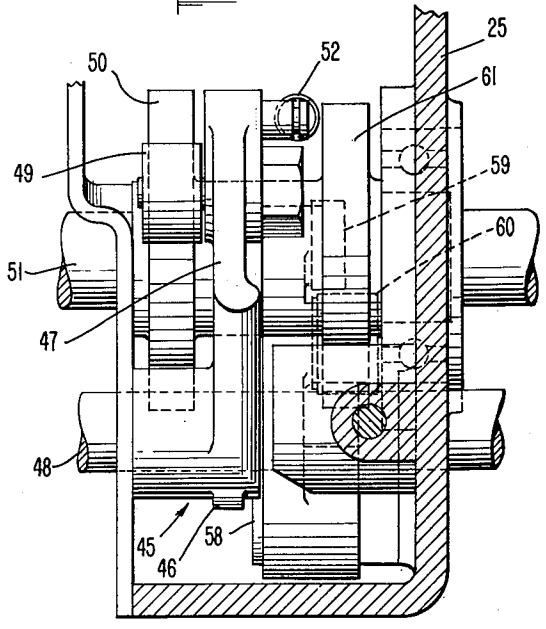



Fig. 5

*INVENTOR.*
JOSEPH R. WICKLAND
*BY*
Bauer and Seymour
ATTORNEYS

Jan. 1, 1963 J. R. WICKLAND 3,071,371

SHEET FEEDING APPARATUS

Filed Dec. 7, 1960 4 Sheets-Sheet 4

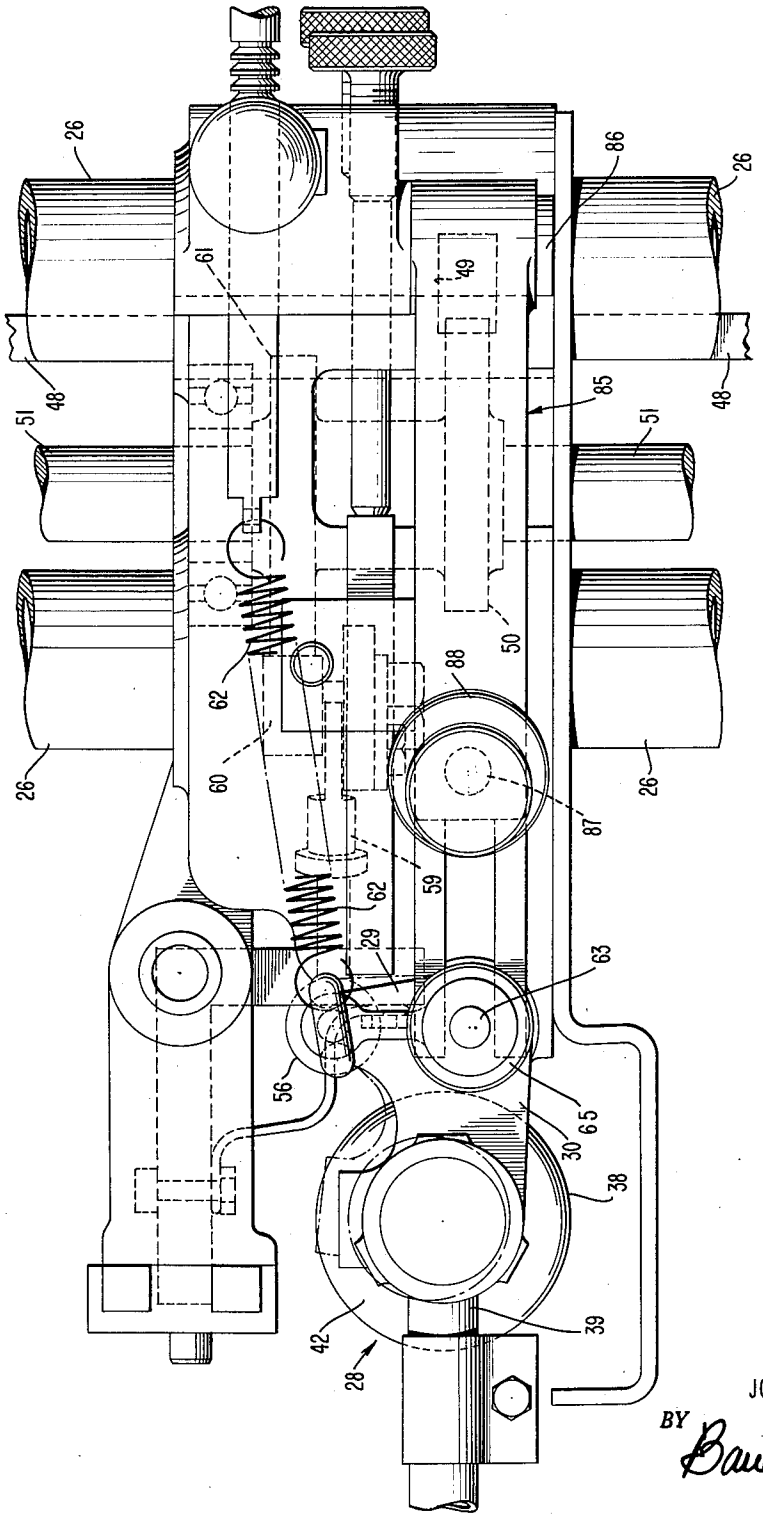



FIG. 7

INVENTOR.
JOSEPH R. WICKLAND
BY Bauer and Seymour
ATTORNEYS

United States Patent Office 3,071,371 Patented Jan. 1, 1963



3,071,371

# SHEET FEEDING APPARATUS

Joseph R. Wickland, Pearl River, N.Y., assignor to Miehle-Goss-Dexter Incorporated, Chicago, Ill., a corporation of Delaware

Filed Dec. 7, 1960, Ser. No. 74,355
8 Claims. (Cl. 271—26)

This invention relates to sheet feeders and more particularly to sheet separating mechanisms of the type employed on opposite sides of the feeder and which function to separate and lift the sheets successively at opposite corner portions thereof from a pile or supply carried on said feeder preparatory to the forwarding of the sheets from said pile or supply.

One object of the present invention is to provide an improved sheet feeder which will efficiently and reliably lift only one sheet at a time from the top of a supply of sheets.

Another object is to provide an improved sheet feeder which will be lowered toward the topmost sheet of a supply stack thereof and which will be raised upwardly away from said topmost sheet instantaneously upon contact with said topmost sheet.

Another object is to provide an improved sheet feeder wherein a pair of spaced apart sheet engaging means are advanced into contact with the topmost sheet of a plurality of winded sheets on a supply stack thereof and which will be raised upwardly away from said topmost sheet instantaneously upon contact with said topmost sheet and at the same time said gripped sheet is stretched while being raised.

Another object is to provide an improved sheet feeder which will have a mechanically controlled descent toward the topmost sheet on a supply stack thereof and a vacuum ascent actuated immediately upon contact with said topmost sheet.

Another object is to provide an improved sheet feeder wherein the downward movement toward the topmost sheet of a supply stack thereof is controlled at a uniform rate and continued until said feed contacts said topmost sheet wherein said feed will immediately be drawn upwardly away from said pile.

Another object is to provide a method of feeding signatures wherein the corner portion of a plurality of sheets on the top of the supply stack thereof is winded and only the topmost of said winded sheets is gripped at the corners by a sheet feeder without moving said sheet downwardly into contact with the adjacent winded sheet.

Another object is to provide a sheet feeder wherein said feeder will be automatically lowered into contact with the topmost sheet of a supply stack thereof without regard for the varying height of said topmost sheet in relation to said feeder and wherein said feeder will be moved away from said supply stack immediately upon contact with said topmost sheet.

A still further object is to provide a sheet feeder wherein a plurality of top sheets on a supply stack have their rear edges winded and wherein said sheet feeder is lowered into contact with the topmost of said winded sheets at a controlled rate of descent and wherein the sheet feeder is moved upwardly away from said supply stack instantly upon contacting said topmost winded sheet so that said topmost sheet is not moved into contact with the adjacent winded sheet and only one sheet at a time is lifted and fed thereby.

The above and further objects and novel features of the present invention will more fully appear from the following detail description when the same is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustrattion only and are not intended as a definition of the limits of the invention.



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

FIG. 7 is an end elevational view of a sheet feeder embodying sheet separating mechanisms contsructed in accordance with the present invention;

FIG. 2 is an enlarged side elevational view, partly in section, of one of the sheet separating mechanisms as viewed from the position indicated by line 2—2 of FIG. 1, the cover plate for the housing being removed and parts broken away for purposes of clearer illustration, and said view showing the operative parts of the mechanism in the positions they occupy when the topmost sheet of the supply stack has been lifted to its uppermost position;

FIG. 3 is an enlarged side elevational view, partly in section, taken along line 2—2 of FIG. 1, the cover plate for the housing being removed and parts broken away for purposes of clearer illustration, said view showing the operative parts of the mechanism in the positions they occupy when the sheet separator approaches the topmost sheet of said supply stack;

FIG. 4 is an enlarged side elevational view, partly in section, of one of the sheet holding foot clamp mechanisms shown in FIG. 1 and as viewed from the position indicated by the line 4—4, the cover plate for the housing being removed for purposes of clearer illustration;

FIG. 5 is an enlarged end elevational view of the sheet separating mechanism as viewed from the position indicated by the line 5—5 of FIG. 3, a portion of the housing being cut away for purposes of clearer illustration;

FIG. 6 is a cross sectional view of a modification of the sheet separator mechanism; and

FIG. 7 is a top plan view of the sheet separating mechanism.

Referring now to the drawings, there is shown in FIG. 1 the rear elevational view of an existing sheet feeder having side frames **10** and **11** and which includes a pile elevator comprising front and rear cross beams **12** adapted to support a pile board **13** and a pile of sheets **14** thereon. The cross beams **12** are supported by side bars **15** which are connected adjacent their front and rear ends to cables **16** that pass over suitable sheaves and around suitable winding drums (not shown). Since the pile elevator which carries the pile of sheets **14** is of well-known construction and operation, further description thereof is unnecessary except to say that as the sheets are fed off the top of the pile the elevator is automatically raised step by step by the rotation of the above mentioned drums to maintain the top of said pile at a predetermined level and thus insure continued and accurate separation and feeding of the sheets from the top of the pile.

The sheets of pile **14** are lifted from said pile one after another at the rear opposite corners thereof by sheet lifting mechanisms to be hereinafter described. Before this operation takes place, however, the rear corner portions of the topmost sheets of said pile **14** are preliminarily separated to insure that the top sheet alone is lifted from the pile by said mechanisms. This preliminary separation of the sheets may be effected by any well-known means for this purpose, for example, comber wheels or, as illustrated herein, by corner air blast devices **17** of substantially the same construction as those disclosed in United States Patent No. 2,434,530, granted January 13, 1948, to Leo C. Williams and needing no detail description herein, except to say that said air blast devices function to raise or "fluff-up" the opposite corner portions of the uppermost sheets whereby said sheets become separated one from another in a progressive manner with the maximum amount of separation being between the topmost sheet and the next or underlying sheets as shown in FIG. 2.

After preliminary separation of the uppermost sheets, and particularly the topmost sheet, has been effected at the rear opposite corner portions thereof, the topmost sheet is lifted from said pile by sheet separator mechanisms 18 and 19. The sheet separator mechanisms are constructed one left-hand and the other right-hand and are each arranged at opposite sides of the feeder and since the construction of said mechanisms are otherwise identical, a description of one will be sufficient for an understanding of both. As shown in FIGS. 2 and 3, each sheet separator mechanism comprises a housing 25 slidably mounted on a pair of spaced apart tubular shafts 26 and secured to said shaft by suitable means, such as clamp screws, in various positions of adjustment along said shafts. Since each of the sheet separator mechanisms 18 and 19 are adjustable independently of each other transversely of the feeder, different widths of sheets may be accommodated. Shafts 26 are suitably secured at their opposite ends in brackets 27 which are in turn slidably mounted on the side frames 10 and 11 to enable the adjustment of the sheet separator mechanisms 18 and 19 as a unit longitudinally of the feeder to accommodate sheets of different lengths.

Each of the sheet separator mechanisms 18 and 19 comprises a cylinder 28 and a pair of outwardly extending collars 29 and 30 secured thereto. Cylinder 28 is pivotally mounted to the forward end of housing 25 by the tubular-shaped pin 31 which extends through suitable openings at the pivot point of collars 29 and 30, and through an annular opening in the forward end of frame 25. Thus cylinder 28 may be freely rotated in a horizontal plane about pin 31. A bore 32 extends longitudinally through the cylinder 28 and has a reduced diameter portion 33 at its lower end. A cover plate seals the bore at the top end of the cylinder. A piston 35 having a stem 34 is fitted for reciprocal movement in bore 32 and through the reduced diameter bore 33. A relatively thin upwardly projecting skirt 36 is formed in the upper surface of the piston head 35. A bore 37 extends longitudinally through the stem 34 and the piston head 35. A bell-shaped adapter 42 is secured to the lower end of the stem 34 and is in communication with the bore 37. A rubber suction cup 38, of substantially the same construction and operation as disclosed in the U.S. Patent No. 2,850,279, granted September 2, 1958, to Stanley T. Stoothoff et al., is operatively connected to the bell-shaped adapter 42. Suction cups of this construction when connected to a source of vacuum and when sealed by contact to a sheet will collapse upwardly as described in the aforementioned patent to give an initial upward movement to the topmost sheet. This small increment of initial upward movement compensates for the over travel of the stem 34 and the suction cup as they come to a stop in their downward movement. A narrow elongated chamber 41 is formed between the inside surface of bore 37 and the outside surface of the stem 34 and between the lower surface of the piston head 35 and the top surface of the shoulder formed by the reduced diameter 33. A radially extending bore 39 is formed in the wall of cylinder 28 at a point just above the reduced diameter portion 33. A source of vacuum, not shown, is secured to bore 39 which in turn communicates with chamber 41. A radially extending aperture 40 is formed in the wall of the stem 34 at a point just below the piston head 35 and connects bore 37 with chamber 41. In operation the suction lifting device contained within cylinder 28 operates as follows. Assuming that the piston 35 is at the upper end of its stroke, as shown in FIG. 2, the piston 35 and the suction cup 38 will be pulled downwardly when the source of vacuum is connected to the chamber 41. When the air is evacuated from chamber 41 and while atmospheric pressure is drawn into the chamber 41 through the aperture 40 and the bore 37, the pressure in chamber 41 will remain lower than the pressure at the top of the piston head 35 which in turn forces the piston and the suction cup 38 downwardly. When the suction cup 38 contacts the topmost sheet on the pile 14 which has been fluffed-up by the corner blast device 17, the suction cup is sealed onto the sheet and immediately air is evacuated from the bore 37 and from the bore 32 above the piston 35 as well as in chamber 41. Since the exposed area at the top of the piston 35 is greater than the exposed area at the bottom, the piston and stem 34 together with the suction cup 38 will be rapidly lifted upwardly until the skirt 36 contacts the top plate on the cylinder 28. As stated earlier, the construction of the suction cup 38 is such that as soon as the suction cup is sealed to the topmost sheet in the pile it immediately collapses upwardly a sufficient distance to compensate for the over travel of the piston 35, which occurs in the time interval that it takes the vacuum source to evacuate the air in bores 37 and 32. It will be seen that as soon as the suction cup 38 contacts the topmost sheet on the pile 14 it will be immediately lifted upwardly and will carry the topmost sheet out of contact with the pile.

An alternative structure for the cylinder 28 is shown in FIG. 6. A bore 90 extends from the upper end of the cylinder to a point short of the lower end of the cylinder. A cap 91 is suitably secured to open end of the cylinder. A reduced diameter bore 92 extends through the lower end wall of cylinder 28. A piston 93 having a stem 94 is fitted for reciprocal movement within bore 90 and through the bore 92. A bore extends axially through the piston and stem and has secured to and is in communication with the suction cup 38. A vacuum inlet pipe 95 projects through an opening in the cover plate 91. Pipe 95 is operatively connected to a source of vacuum (not shown). The upper surface of piston 93 has a recessed portion 96 to accommodate one end of a spring 97. An aperture 98 connects with the atmosphere the interior area of bore 90 which lies below the head portion of piston 93. Thus atmospheric pressure is constantly maintained in this area. In operation the spring 97 will drive the piston 93 downwardly so that arm 54 and pin 63 are in contact with the end 53 of arm 46. Consequently arm 46 and cam 50 control the rate of downward movement of suction cup 38. Suction is maintained in the suction cup 38. As soon as the suction cup contacts the topmost fluffed-up sheet the air is evacuated from bore 90 and piston 93 is immediately lifted upwardly against the compressive force of spring 97 thus compressing said spring into the upper portion of the bore. It will be observed that as soon as the vacuum is cut off, the sheet which has been secured to the suction cup 38 will be released. At the same time the compressed spring 97 will tend to push the piston 93 downwardly toward the pile of sheets. However, the outer end 53 of the arm 46 has moved upwardly while the suction has been cut off and once again controls the downward movement of the piston and suction cup.

It is most desirable that the speed of the downward movement of the suction cup 38 be controlled so that it does not have the effect of pounding the topmost fluffed-up sheet into contact with the fluffed-up sheet immediately below it. If this occurs on ordinary sheets of paper the suction will bleed through the topmost sheet and attract the sheet adjacent to it thus resulting in a double feed. To avoid this difficulty there is provided a control mechanism comprising a bell crank 45 having arms 46 and 47 and being pivotally connected at 48 to the housing 25. A cam follower 49 is rotatably mounted in the end of arm 47. A cam shaft 51 extends transversely to the feeder through the housing 25 and is journalled in suitable bearings in said housing. Cam shaft 51 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. A cam 50 is secured to shaft 51 in alignment with roller 49. The spring 52 is

secured at one end of arm 47 and its other end to the frame 25 to hold roller 49 in constant contact with cam 50. Arm 46 extends forwardly and has at its forward end an upwardly projecting bearing surface 53. Stud pin 63 is slidably retained within pin 31 and has an enlarged plate 64 secured to its lower end and a nut 65 threadedly secured at its upper end. An arm 54 is secured to and radially extends from the lower end of stem 34 and has its other end slidably retained over pin 63. Plate 64 serves as a stop member to retain arm 54 in slidable engagement with pin 63. A stop arm 85 is pivotally mounted at 86 to the top surface of housing 25. The forward end of arm 85 is bifurcated and extends on either side of the pin 63. An adjustment pin 87 is threadedly mounted through arm 85 and the forward end thereof bears against the top surface of the housing 25. In normal operation the bufurcated portion of arm 85 does not prevent the pin 63, stop plate 64 and arm 54 from following the entire downward movement of the bearing point 53 on arm 46 on the bell crank 45. Sometimes because of the type of sheet material being fed, it becomes desirable to stop the downward movement of the suction cup prior to the lowermost position in the path of movement of the arm 46. This is accomplished by raising the bifurcated portions by threading the pin 87 into the arm 85. In this manner the nut 65 abuts the bifurcated portions and restrains the downward movement of pin 63 and suction cup 38.

It will be seen that for each complete cycle of operation, that is, the feeding of each sheet, the lever arm 46 and its rounded end portion 53 will bear against the plate 64 and will be moved from a position in which it holds the suction cup and the pin 63 at their uppermost positions to a position in which it holds the suction cup and pin 63 in their lowermost position and back again to complete the cycle. As described earlier, the suction cup 38 will be pulled downwardly by the vacuum so that the arm 54 will constantly urge the plate 64 and pin 63 into contact with the rounded end portion 53 of the lever arm 46. As said lever arm is moving in its downward stroke the suction cup will drop rapidly to a point just above the topmost fluffed-up sheet and then descend at a slower rate as it approaches the top-most fluffed-up sheet. This movement is controlled by the shape of cam 50. As soon as the suction cup contacts the topmost sheet it will be carried upwardly as described above. While the suction cup is being carried upwardly the crank arm 46 continues to its lowermost position of its cycle and remains there for a brief period before it moves to its uppermost position at a uniform rate, at which point it supports the suction cup just before it starts its descent for the next cycle of operation. This controlled downward movement of the suction cup prevents the suction cup, upon contact with the topmost sheet, from pushing that sheet downwardly into contact with the adjacent sheet and thus assures that only the topmost sheet is lifted upwardly. Furthermore, the lowermost position of the arm 46 is below the normal level of the fluffed-up sheet corners so that the suction cup 38 will always be carried into contact with the topmost fluffed-up sheet regardless of how much that topmost sheet happens to have been lifted above the top of the pile by the corner blast device 17.

In addition to the vertical movement of the suction cups 38 toward and away from the top of the pile of sheets, each of the separator mechanisms 18 and 19 are so mounted that they are horizontally rotatably movable away from each other in such a manner that the lifted sheet is stretched. The mechanism for performing this operation is best shown in FIGS. 2, 3 and 7 wherein there is an integrally formed arm 56 horizontally extending at right angles to each of the collars 29 and 30, respectively, on cylinder 28. A vertically extending crank 57 is pivotally mounted at its lower end at 58 to the housing 25. A link 59 is pivotally connected at one end to the upper end of the crank 57 and is pivotally connected at its other end to the arm 56 on the collar 30. A cam follower 60 is rotatably mounted on the crank 57 to engage cam 61 which is fixedly secured to and rotatable with shaft 51. A spring 62 is secured at one end to arm 56 on collar 29 and its other end to the frame 25 whereby the cylinder 28 is rotatably moved to retain the cam follower 60 in constant contact with its cam 61. Cam 61 has a contour and is positioned on shaft 51 in relation to cam 50 so as to permit each of the cylinders 28 and suction cups 38 at each side of the pile to be closest to each other as said suction cups are positioned at their lowermost position engaging the topmost fluffed-up sheet and are the furthest from each other at the uppermost position of the suction cups. Thus the suction cups engage the topmost fluffed-up sheet at opposite corners and after said sheet is lifted the suction cups are pivotally and horizontally moved away from each other thereby causing said sheet to be stretched therebetween.

A timing mechanism of any well known construction (not shown) controls the suction in chamber 41 of the cylinder 28 by controlling the vacuum in the line which is connected to port 39. Said timing mechanism is actuated in timed relation to the reciprocable movement of the suction cups 38 so that a vacuum is supplied to said suction cups at all times except for the brief interval when the sheet forwarding devices (not shown) are moving the sheet forward after it has been lifted. A second timing mechanism (not shown) controls the compressed air to the corner blast devices 17 and to the foot clamp means, to be hereinafter described, and is driven from shaft 51.

After the topmost sheet has been separated and lifted at and along the rear edge thereof, as described above, and while the sheet is still gripped by the suction cups 38 it is winded from below to completely separate the same from the next or underlying sheet. This is accomplished by sheet holding and winding foot clamp mechanisms of substantially the same construction and operation as those disclosed in United States Patent No. 2,402,453, granted June 18, 1946, to Walter E. Schneider. These sheet holding and winding foot clamp mechanisms indicated generally at 66 and 67 of FIG. 1 are constructed one left hand and the other right hand and are arranged at the rear and opposite sides of the feeder adjacent the sheet separator mechanisms 18 and 19. Since the construction of the mechanisms 66 and 67 are identical, a description of one will be sufficient for an understanding of both. As shown in FIG. 4 each sheet holding and winding foot clamp mechanism comprises a housing 68 and a cover plate removably secured to said housing at the inner open side thereof. The housing 68 is slidably mounted on and capable of adjustment along the tubular shafts 26 and each housing is secured in various positions on said shafts by set screws or similar devices. The cam shaft 51 extends through the housing 68 and is journalled in suitable bearings in said housing.

Disposed within each housing 68 and secured to and rotatable with the cam shaft 51 is a cam 69 which engages a cam follower 70 that is rotatably mounted on the inner side of the upwardly projecting arm 71 of a bell crank 72. The bell crank 72 is pivotally mounted in the housing 68 and is provided with an arm 73 which projects forwardly beyond the housing 68 through a suitable clearance opening in said housing. The cam follower 70 is continuously biased toward the cam 69 by a spring 74 which has one end thereof secured to the upper end of bell crank arm 71 and the other end secured to the housing 68. Pivotally connected to the free forward end of the bell crank arm 73 is an upwardly projecting cam link 75 having a closed cam groove 76 therein within which is engaged a roller 77 that is journalled on an arm 78 formed integrally with and projecting forwardly of the housing 68. Secured to or formed integrally with the lower end of cam line 75 is a rearwardly projecting arm 79 in which is adjustably clamped

a downwardly and forwardly extending hollow foot clamp 80. Through the combined action of the bell crank levers 72 and the cam grooves 76 in the links 75 effected by the springs 74 and the cams 69, the arm 79 is moved in unison downwardly and upwardly and at the same time is swung about the pivots at the forward end of the bell crank arm 73 in counterclockwise and clockwise directions, respectively, once during each cycle of operation of the feeder. This results first in a downward forward movement and then in an upward backward movement of the foot clamps 80. As well understood in the art, the described downward forward movement of the foot clamps 80 effected by the springs 74 is so timed that it occurs after the topmost sheet is lifted by the suction cups 38 and before said sheet is released by said suction cups and forwarded relative to the pile 14 thus resulting in engagement of said foot clamps under yielding spring pressure with the top surface of said pile beneath the lifted sheet as shown and winding of said sheet to completely separate the same from the next or underlying sheet. Likewise, the described upward backward movement of the foot clamps 80 effected by the cams 69 is so timed that it occurs just as or immediately after the lifted topmost sheet released by the suction cups 38 is forwarded relative to the pile 14 and delivered in lapped or unlapped relation with a preceding sheet to known conveyor means (not shown) by known sheet forwarding devices (not shown) which in the type of feeder illustrated herein engage the rear portions of the sheet at which time the suction cups 38 have already begun their next downward movement and are approaching the top of the pile 14. Accordingly, the underlying sheet is held by the foot clamps 80 against displacement while the lifted topmost sheet is being forwarded from the pile 14. The forwardly directed currents of air discharged from said foot clamps further act in conjunction with the sheet forwarding devices to forward the topmost sheet and said underlying sheet is then released by the foot clamps for subsequent lifting by the suction cups 38. Air under pressure is delivered to the foot clamps 80 through flexible conduits 81 which are connected to the foot clamps and with a suitable valve mechanism (not shown) that is turn connected with a suitable source of compressed air. The forward winding of each lifted sheet may be accomplished by separate stationary blow pipes located rearwardly of the rear vertical projection of the pile 14 in which case the foot clamps 80 will act only as foot clamps and may be solid. It is important to note that the extent of downward movement of the foot clamps 80 by the springs under control of the cam 69 progressively increases as the sheets are fed from the top of the pile 14 and the height of said pile accordingly decreases, and decreases as the top of the pile is restored to its normal feeding level through operation of the pile elevator and raising of said pile thereby.

The operation of the sheet feeder embodying the present invention will be clearly understood from the foregoing description. While the description and the accompanying drawings set forth with more or less particularity one embodiment of the invention, it is to be expressly understood that said invention is not limited to said embodiment. Various 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, and will now be apparent to those skilled in the art. For a definition of the limits of the invention, reference is had primarily to the appended claims.

What is claimed is:

1. Apparatus for feeding sheets successively from the top of a supply thereof comprising sheet gripping means mounted for reciprocal movement toward and away from said supply whereby at least a portion of the topmost sheet of said supply is lifted, means for moving said sheet gripping means downwardly, means temporarily contacting said gripping means for controlling the rate of downward movement of said sheet gripping means, and means responsive to the contact of said gripping means with the topmost sheet of said supply for moving said gripping means upwardly away from said supply and out of contact with said controlling means.

2. Apparatus for feeding sheets successively from the top of a supply thereof comprising means to separate one edge of the topmost sheet from said supply, sheet gripping means reciprocally movable toward and away from said supply, means operatively associated with said gripping means to control the movement of said gripping means until the same contacts the topmost separated sheet, and means independent of said control means to disassociate the control means from the gripping means and to move said gripping means to a position removed from said supply when the same contacts said separated topmost sheet.

3. Apparatus for feeding sheets successively from the top of a supply thereof comprising means to separate one edge of the topmost sheet from said supply, sheet gripping means movable toward and away from the top of said supply, means to impart a downward movement on the gripping means as long as the gripping means is not in contact with a sheet and to impart an upward movement thereon when the gripping means comes into contact with the topmost sheet, and means operatively associated with said gripping means to control the rate of downward movement of said gripping means whereby the said gripping means is rapidly decelerated as it approaches said topmost separated sheet and upon contact therewith instantly moves upwardly away from said supply and out of operative association with said control means.

4. Apparatus for feeding sheets successively from the top of a supply thereof comprising means to separate one edge of the top most sheet from said supply, sheet gripping means reciprocally movable from a first position removed from said supply to a second position in contact with the topmost separted sheet of said supply, means for controlling reciprocal movement of said gripping means and movable from the first position of said gripping means to a third position below the level of said separated topmost sheet, means to retain the gripping means in operational contact with said controlling means when said gripping means is not in contact with a sheet and means independent of said controlling means to move said gripping means out of operational contact with said control means and upwardly to said first position upon contact with said topmost sheet.

5. In a sheet feeder the combination comprising a pair of sheet gripping means arranged above a supply of sheets and mounted for reciprocal movement toward and away from the top surface thereof, means for moving said gripping means toward said sheet supply, means operationally contacting said gripping means for controlling the rate of downward movement of said gripping means, and means responsive to the contact of said gripping means with the topmost sheet of said supply for moving said gripping means upwardly away from said top surface and out of operational contact with said control means.

6. In a sheet feeder the combination comprising means to separate one edge of the topmost sheet from a supply thereof, a pair of sheet gripping means reciprocally movable toward and away from said supply to grip the topmost separated sheet at transversely spaced points, means operationally contacting said gripping means for controlling the movement of each of said gripping means until each contacts the topmost separated sheet, and means independent of said control means and independent of each other to move each of said gripping means out of operational contact with said control means and away from said supply when each gripping means contacts the topmost separated sheet.

7. In a sheet feeder as defined in claim 6 comprising means for mounting each of said gripping means for

pivotal movement in a plane parallel to the surface of the sheets in said supply, and means pivotally move each of said gripping means away from each other while said gripping means are moving away from said supply whereby each sheet is stretched.

8. In a sheet feeder the combination of a plurality of sheet gripping means arranged above a supply of sheets and mounted for reciprocal movement toward and away from said supply, means associated with each gripping means for moving each toward said sheet supply, means means operatively associated with each gripping means for controlling the rate of downward movement of each



of said gripping means, and means responsive to the contact of each gripping means with the topmost sheet of said supply for moving each gripping means independently upwardly away from said sheet supply and out of operative association with said controlling means.

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