

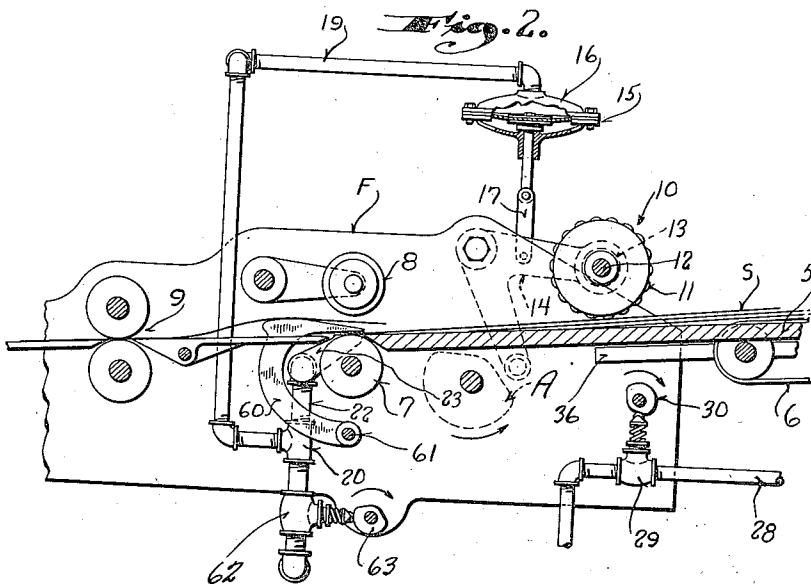
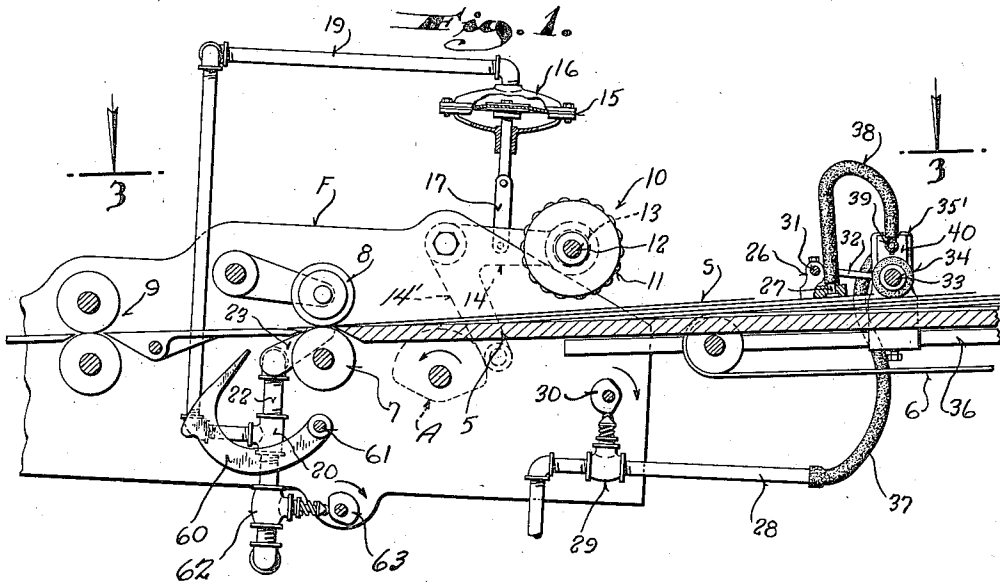
June 1, 1937.

E. W. BELLUCHE ET AL
SHEET FEEDING MACHINE

2,082,239

Filed Dec. 9, 1935

6 Sheets-Sheet 1



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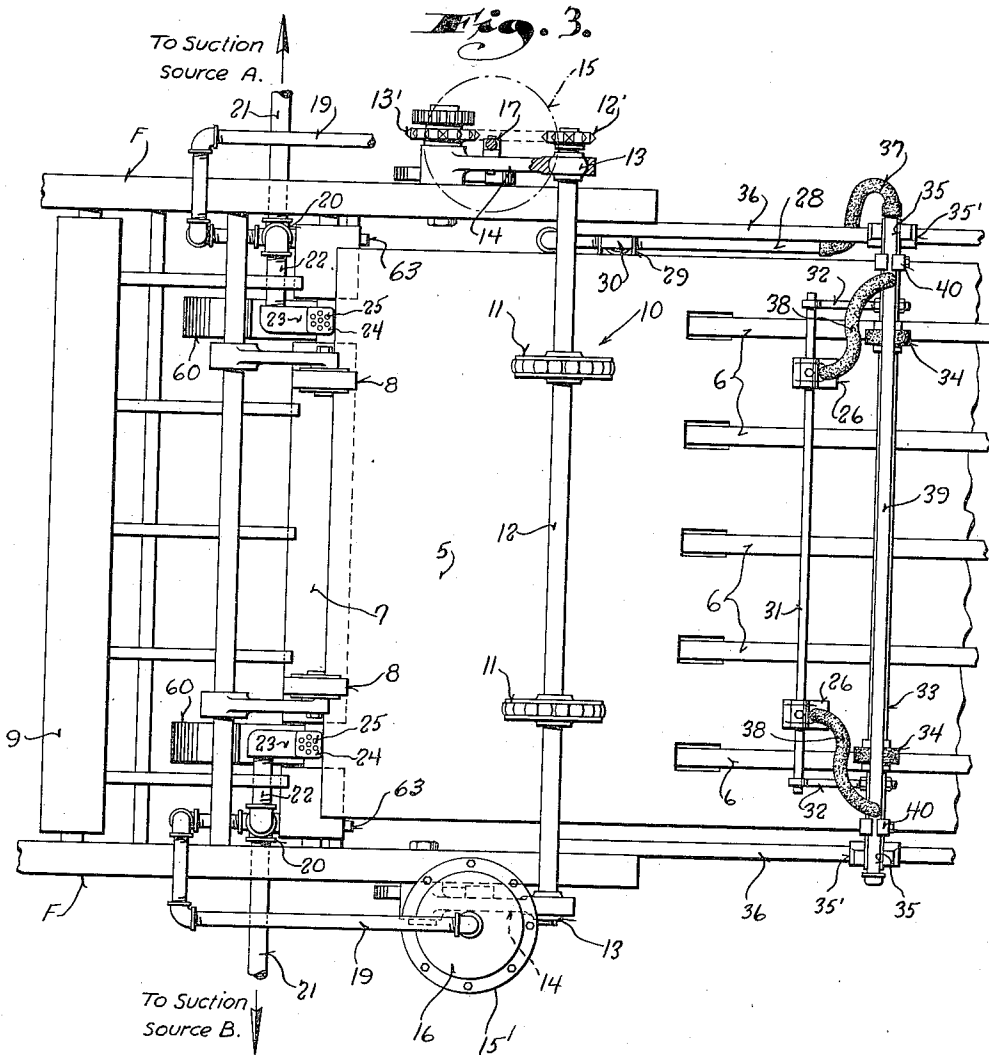
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SHEET FEEDING MACHINE

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6 Sheets-Sheet 2



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SHEET FEEDING MACHINE

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6 Sheets-Sheet 3

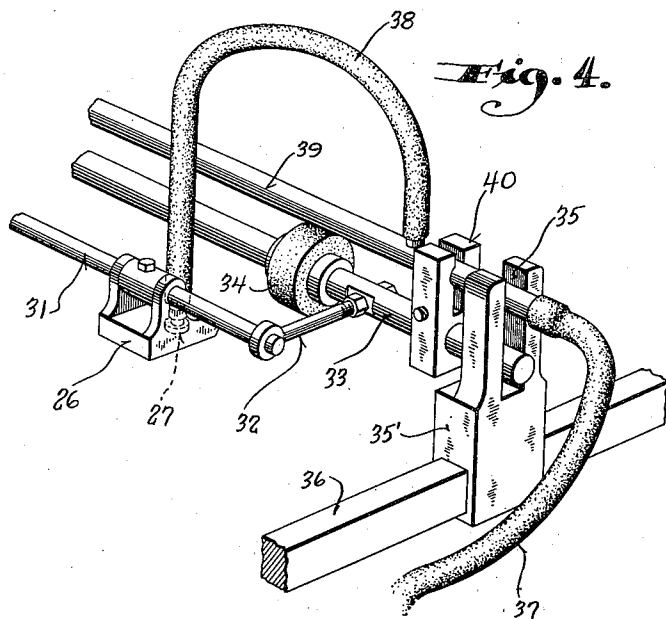


Fig. 4.

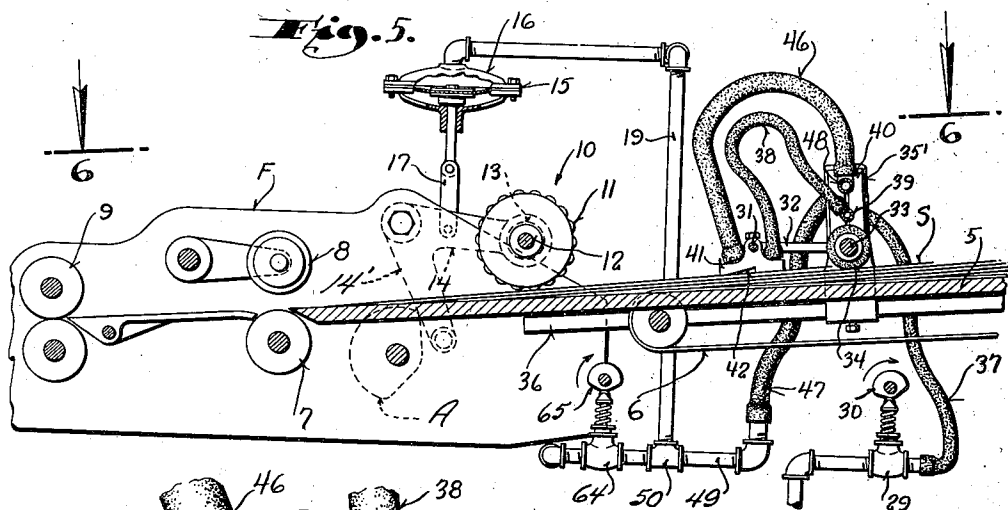


Fig. 5.

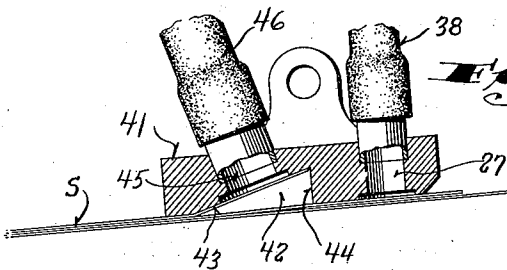


Fig. 7.

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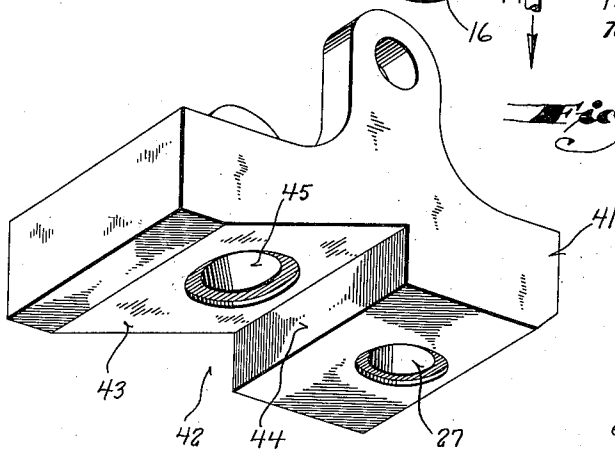
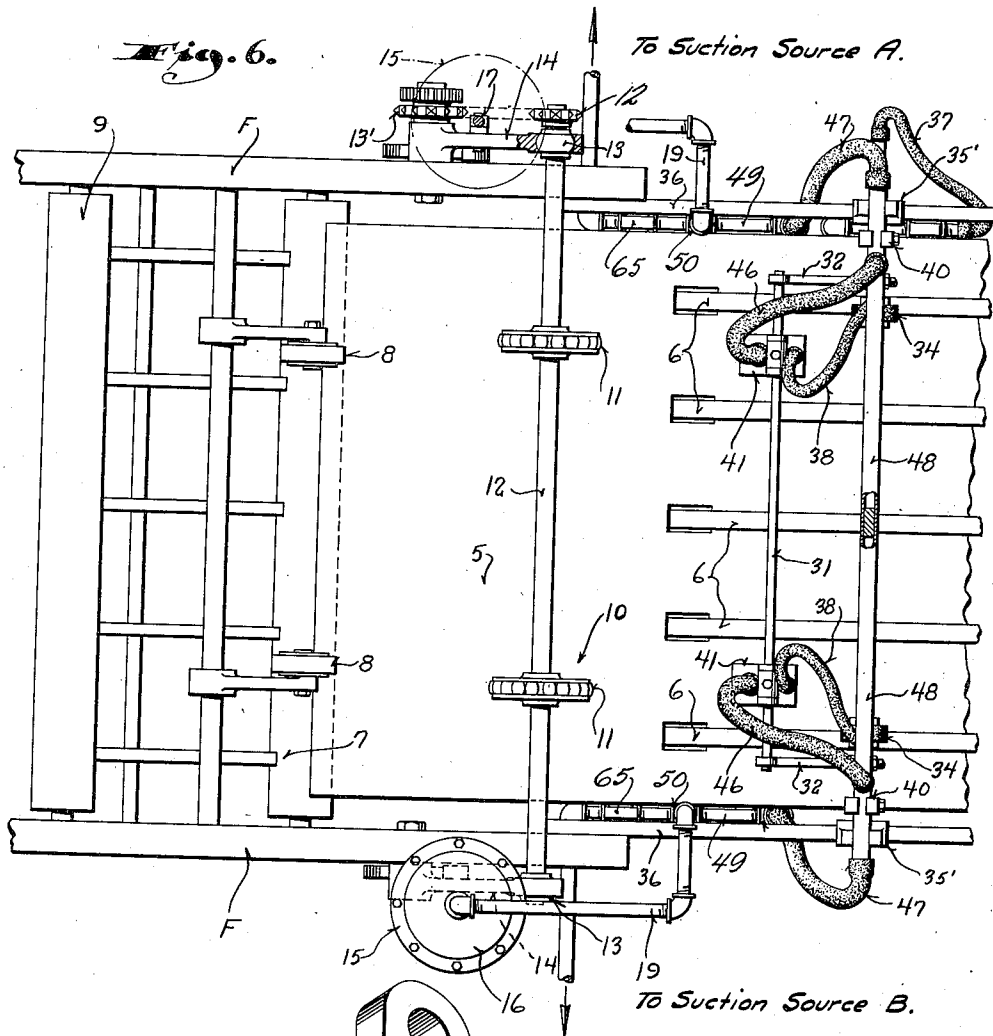
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SHEET FEEDING MACHINE

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6 Sheets-Sheet 4



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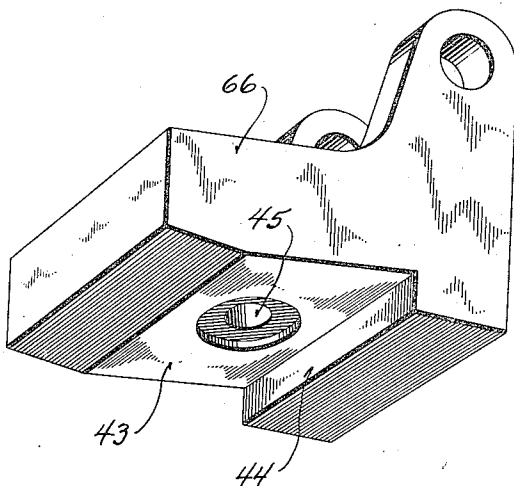
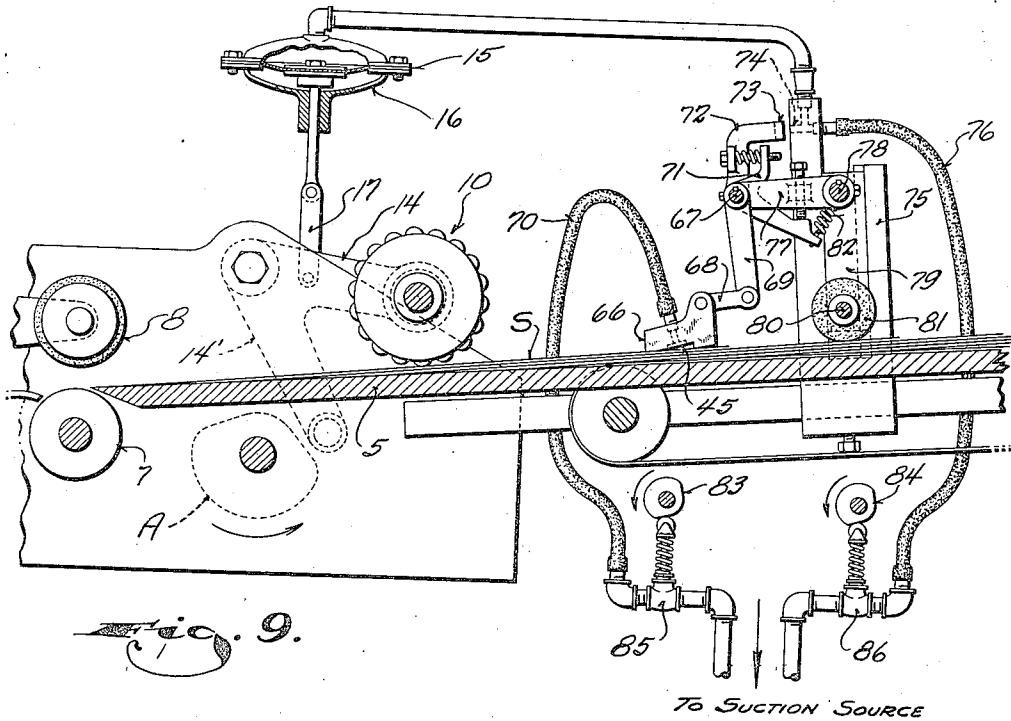
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SHEET FEEDING MACHINE

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6 Sheets-Sheet 5



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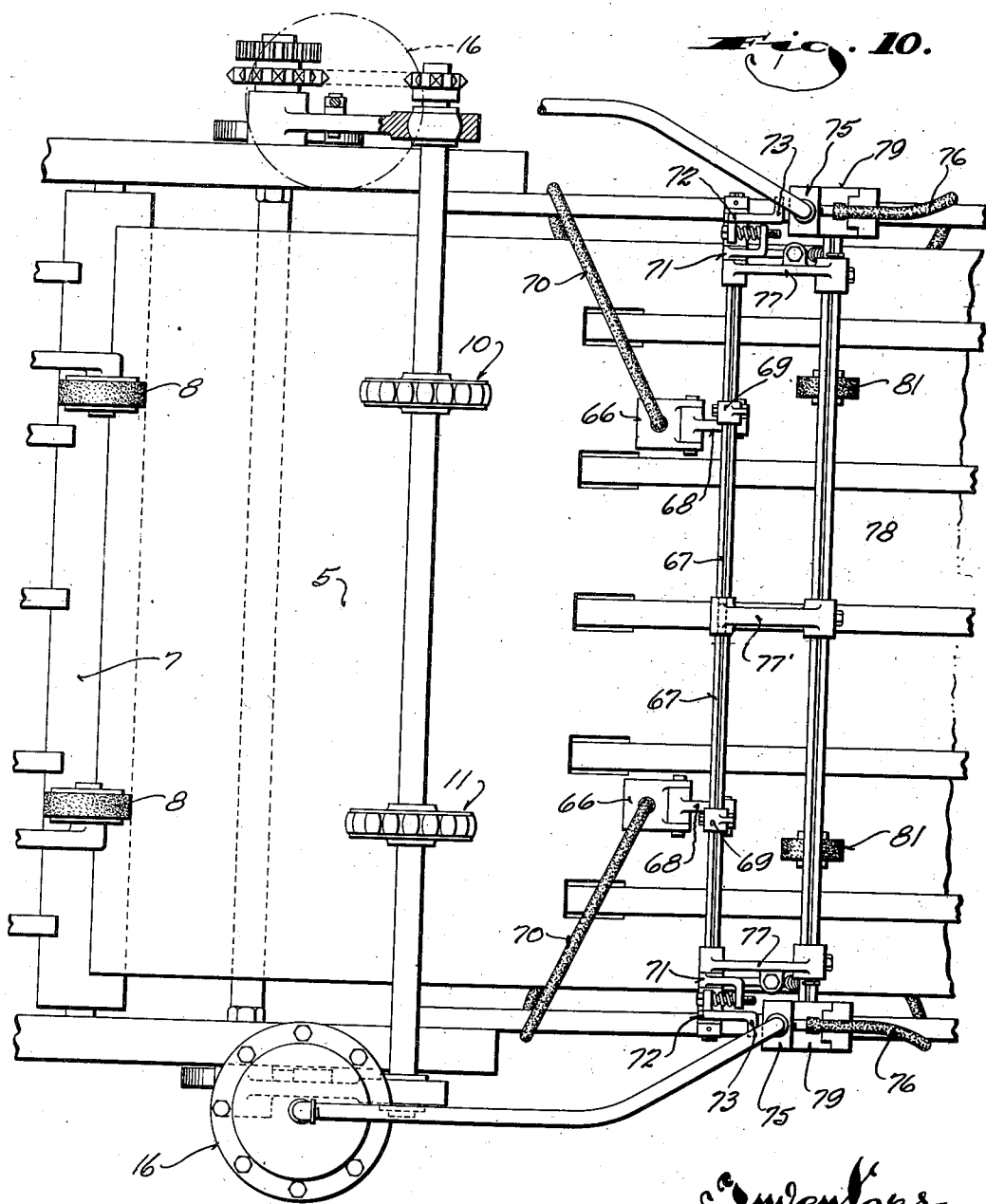
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SHEET FEEDING MACHINE

Filed Dec. 9, 1935

6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

2,082,239

SHEET FEEDING MACHINE

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Application December 9, 1935, Serial No. 53,490

27 Claims. (Cl. 271—38)

This invention relates to sheet feeding machines and refers more particularly to sheet feeders of the type in which a bank of fanned out sheets is advanced over a feed table to a point of discharge and wherein a sheet combing separator operates on the bank of sheets to separate the same for individual withdrawal from the bank.

In sheet feeding machines of this character, the sheet combing separator operates on the bank of sheets intermittently so that during the actual withdrawal of the top sheet from the bank the combing wheel is raised. The lifting of the combing wheel must be coordinated with the presentment of the topmost sheet to the withdrawing means by which the said sheet is withdrawn from the bank.

Heretofore, it was customary to provide trip fingers engageable by the leading edge of the sheet to initiate the functioning of the separator lifting mechanism. This manner of controlling the lifting of the combing wheel has been found objectionable and it is therefore an object of this invention to provide new and improved means for controlling the functioning of the separator lifting mechanism which obviates the need for trip fingers to be moved by the advance of the top sheet.

More specifically it is an object of this invention to provide a sheet feeder wherein the passage of the topmost sheet over a suction port initiates the functioning of the lifting mechanism.

A further object of this invention is to provide suction responsive means for lifting the combing wheel and a normally open suction port disposed in the path of the topmost sheet for controlling the functioning of the lifting means.

Another object of this invention is to improve the means for holding the second sheet against movement during the actual withdrawal of the topmost sheet.

In this respect, it is a further object of the invention to provide pneumatic means for holding the second sheet and to synchronize the functioning thereof with the operation of the machine so that whenever the topmost sheet is being withdrawn said suction means is effective to hold the second sheet.

Another object of this invention resides in the provision of a single unit having combined therein the suction port for controlling the functioning of the lifting mechanism and the tail clamping means for holding the second sheet during withdrawal of the topmost sheet.

Heretofore, it has been customary to convey the sheets individually in spaced or end to end relationship from their point of separation to the press. This, of course, necessitated bringing the sheets to the front guides of the press at press speed. Where the press speed is comparatively slow, this plan presents no difficulties, but

with the modern high speed presses complications are encountered making it desirable to carry the sheets forward all the way to the front guides at a relatively slow speed. This necessitates advancing the sheets in overlapped relationship after they have been separated; and it is thus a further object of this invention to provide simple means for clearing the trailing portion of one sheet from the path of the following sheet so as to make possible proper separation of the sheets from the advancing bank and at the same time have the sheets travel from the separating means to the press front guides in overlapped relationship.

In this connection it is a specific object of this invention to provide simple means for stripping or lifting a sheet from the suction shoe or shoes in time to permit the following sheet to ride over and operatively engage the suction shoe or shoes.

A further object of this invention is to provide pneumatic control means for effecting the lifting of the combing wheel off of the bank of sheets which is so arranged that movement of a movable suction port by the advance of the sheets is necessary to the functioning thereof.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate several complete examples of the physical embodiment of the invention constructed according to the best modes so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a vertical longitudinal section view of part of a continuous sheet feeder illustrating the application of this invention thereto and showing the suction ports covered by the leading portion of a sheet and the combing wheels just lifted;

Figure 2 is a view similar to Figure 1 but showing the parts in a subsequent stage of operation with the combing wheels down and the leading sheet lifted off of the suction shoes;

Figure 3 is a top plan view of the portion of the feeder shown in Figure 1, said view being taken on the plane of the line 3—3 in Figure 1;

Figure 4 is a detail perspective view showing the tail clamping means;

Figure 5 is a view similar to Figure 1 illustrating a modified embodiment of the invention;

Figure 6 is a top plan view taken on the plane of the line 6—6 in Figure 5;

Figure 7 is a detail section view through the combined suction port and tail clamp of the

modification shown in Figures 5 and 6 and illustrating its association with the bank of sheets; Figure 8 is a perspective view of said combined unit;

5 Figure 9 is a view similar to Figure 5 illustrating a further modified embodiment of the invention;

Figure 10 is a top plan view of the portion of the feeder shown in Figure 9; and

10 Figure 11 is a perspective view of the suction shoe shown in Figures 9 and 10.

Referring now more particularly to the accompanying drawings in which like numerals indicate like parts throughout the several views, the numeral 5 designates the feed table of a conventional continuous sheet feeder over which a bank of sheets S is advanced by endless conveyor tapes 6. The bank of sheets S is fanned out in the usual manner and is advanced over the table 20 to the front edge thereof at which sheet withdrawing means in the form of a driven roller 7 and a drop roll 8 are located to grip the leading edge portion of the sheets and project them forwardly between another set of rolls 9 rotating at the same rate of speed as the roller 7 by which they are advanced to the press or other machine with which the feeder is associated.

To separate the sheets as they advance toward the front edge of the table, a sheet combing separator indicated generally by the numeral 10 is provided. As is customary, this separator comprises combing wheels 11 mounted on a common continuously driven shaft 12. The shaft 12 is journaled in bearings 13 on the outer ends of arms 14 pivotally mounted in any suitable manner as by studs carried by the side frames F of the feeder. The pivotal mounting of the arms is coaxial and independent to permit either separate or simultaneous lifting of the arms and the shaft 12, the bearings 13 being so constructed as to allow a degree of tilting of the shaft necessitated by the lifting of one end thereof in advance of the other.

The drive for the combing wheels may be effected through a chain or other flexible driving element trained over sprockets 12' and 13', respectively, carried by the shaft 12 and the mounting stud of one of the arms 14, the latter sprocket 13' being driven in any suitable manner from the mechanism of the feeder (not shown).

To intermittently lift the combing wheels from the bank of sheets so that during the withdrawal of the topmost sheet the wheels are raised clear of the bank, two suction responsive diaphragms 15 are provided. The diaphragms close diaphragm chambers 16 mounted in any suitable manner (not shown) above the side frames F of the machine. Each diaphragm has a connection 17 with one of the pivoted arms 14, so that upon response of the diaphragms to suction within the chambers 16, both ends of the shaft 12 and consequently both the combing wheels are lifted simultaneously, or one in advance of the other, depending upon whether or not suction is applied to both diaphragms concomitantly or successively.

The diaphragm chambers 16 are connected through pipe lines 18 with T-fittings 20. From the T-fittings 20 main ducts 21 lead to sources of vacuum (not shown), there being two distinct sources as indicated in Figure 3 so that the operation of one diaphragm is independent of the other. The other branches of the T-fittings 20 have lines 22 connected thereto, each

of which leads to one of a pair of suction shoes 23. The suction shoes 23 are mounted with a surface 24 near the front edge of the table and flush with the top thereof so that sheets advanced over the table also pass over the surface 24. While the suction shoes as shown are immovable, it is to be understood that they may be adjustable transversely of the feeder to facilitate the handling of different width sheets. In that event, the suction lines to the shoes would include flexible portions.

The surface 24 of each shoe has a plurality of apertures 25 which together provide an open port of an area sufficiently large so that the entire effect of the suction is spent therethrough. Consequently, as long as the suction ports provided by the plurality of apertures 25 are open, there is no response on the part of the diaphragms 15. However, when the topmost sheet is advanced into position to be gripped by the withdrawing rollers 7 and 8, as shown in Figure 1, the suction ports are closed and the suction is effective to actuate the diaphragms and lift the combing wheels. If the sheet moves forward with one side in advance of the other so that one suction port is closed before the other, the combing wheels will be correspondingly lifted one after the other and the sheet straightened.

During the withdrawal of the topmost sheet from the bank, it is desirable to hold the next adjacent sheet and heretofore this has been done by providing a tail clamp raised and lowered in synchronism with the operation of the machine to come down into operative position as the topmost sheet was withdrawn.

In the present invention the means for holding the next sheet is improved through the use of suction and for this purpose a pair of blocks 26 having suction ports 27 are mounted in position to rest on top of the bank of sheets. The suction ports 27 are connected through a suction line 28 with a source of vacuum. A valve 29 interposed in the line controls the connection of the ports with the source of vacuum. This valve is operated by a cam 30 synchronized with the withdrawing means so that whenever a sheet is being withdrawn, the cam is in its position opening the valve 29 and connecting the ports 27 with the source of suction.

Whenever the ports 27 are so connected with the source of suction, the effect of the suction is to draw the block firmly down onto the bank and thus hold the sheet next adjacent the topmost sheet during the withdrawal of said topmost sheet.

To mount the blocks 26 so that they may be adjusted to different sized sheets and rise and fall as the height of the bank varies, they are both adjustably pivoted to a cross bar 31 carried by arms 32 fixed in endwise adjustable relationship to a shaft 33 extending across the feed table. The shaft 33 has rollers 34 which rest on the top of the bank to support the shaft 33 at a definite elevation above the bank and the ends of the shaft 33 are received in vertical guideways 35 formed in guides 35' slidable on fixed longitudinal rails 36.

The guides 35' being adjustable on the rails 36, it will be readily apparent that the entire mechanism may be moved towards or from the front of the feed board to properly dispose the blocks 26 for sheets of different lengths, and to compensate for this motion of the blocks, the suction line 28 is formed partially by flexible hoses 37 and 38.

The hose 37 connects with one end of a cross pipe 39 supported above the shaft 33 by clamp fixtures 40 mounted on the shaft 33. This cross pipe 39 has nipples to which the hoses 38 are attached, the opposite ends of which are connected to the ports 27 in the blocks.

As noted hereinbefore, it is the purpose of this invention, aside from improving and simplifying the control of the combing wheels, to provide a construction which makes possible a relatively slow overlapped advance of the sheets from the separating means to the press front guides to preclude the complications incident to fast sheet travel in the presentment of the sheets to the press. For this purpose, the trailing edge of each sheet is lifted off of the suction shoes by stripper fingers 60 in time to permit the next sheet to advance over the suction shoes while at the same time it is overlapped by the preceding sheet.

The stripper fingers are mounted on a rock shaft 61 extending transversely across the feeder structure beneath the roll 7 and oscillated by suitable driving connections (not shown) so as to project the curved outer ends of the fingers 60 across the top of the suction shoes at the time the drop roll 8 rises. As a result of this rocking motion of the stripper fingers, the sheet closing the suction ports is lifted (see Figure 2), thus breaking the vacuum by which the diaphragms 15 are held up and allowing the combing wheels to descend and advance the next successive sheet over the suction shoes and under the preceding sheet.

It is of course understood that the sheets are gripped by the rolls 9 before the stripper fingers act and the drop roll 8 is lifted.

While the objects of the invention are attained by the mechanism as described so far, it has been found desirable for practical reasons to hold the combing wheels off of the bank of paper mechanically after they have been raised by the suction responsive means and to also shut off the suction from the shoes 23 after the lifting of the combing wheels.

For this purpose, cams A are provided to engage cam followers fixed to the ends of extensions 14' on the pivoted arms 14. Thus a short time after the combing wheels have been raised by the suction responsive means, the cams A will be in position to mechanically hold the combing wheels off of the bank of sheets until that point in the cycle at which combing is again required.

Valves 62 controlled by cams 63 operate to shut off the suction from the shoes 23 after the cams A have revolved to hold the combing wheels in their raised positions, and the suction remains shut off while the drop rolls 8 and the stripper fingers 60 perform their functions. The shoes 23 are again connected with the suction a short time after the combing wheels have been lowered onto the bank of sheets S.

In the modified embodiment of the invention illustrated in Figures 5 to 8, inclusive, the ports for controlling the functioning of the lifting mechanism are directly associated with the tail clamp and for this purpose blocks 41 similar to the blocks 26 are provided. The mounting of the blocks 41 is the same as that described in connection with the mounting of the blocks 26, but their construction is different.

The forward portion of each block 41 has a substantially triangular shaped transverse groove 42 opening to opposite sides of the block and defined by an inclined wall 43 and a substantially vertical wall 44. The groove formed by these

walls when the block rests on the bank of sheets defines a transverse chamber or passage open at its ends. Communicated with this undercut portion of the block is a suction port 45. The suction port of each block is connected by a suction line including hose connections 46 and 47, a cross pipe 48 blocked at its center and pipe lines 49 to a separate source of vacuum. One branch of T-fittings 50 in the pipe lines 49 connects the pipe line 19 coming from the vacuum chamber with the source of vacuum.

Inasmuch as the chambers or passages formed by the transverse grooves 42 of the blocks 41 are open at their ends, their suction ports 45 are normally open to the atmosphere so that the effect of suction is spent entirely therethrough to prevent the response of their respective diaphragms 15. However, when the tail edge of the topmost sheet is advanced sufficiently far that it passes the abrupt vertical walls 44, it will be free to snap up against the inclined walls 43 in response to the suction at the ports 45 thus closing the same and effecting the lifting of the combing wheels.

Rearwardly of their transverse grooves 42, the blocks 41 have the suction ports 27 formed therein which, as described hereinbefore, are connectible with a source of vacuum at predetermined intervals as determined by the operation of the cam 30, and being disposed rearwardly of the walls 44, it follows that the trailing edge of the sheet uncovers the ports 27 substantially at the time it aligns with the transverse grooves and functions to render the lifting mechanism operable so that when the suction is applied to the ports 27, the next adjacent sheet will be disposed thereunder.

As in the embodiment of the invention shown in Figures 1 to 4, inclusive, the combing wheels may be held in their raised positions mechanically by the cam A and shortly thereafter the suction to the ports 45 may be shut off by valves 64 controlled by cams 65.

In the further modified embodiment of the invention shown in Figures 9 to 11, inclusive, movable tail drags in the form of blocks 66 are utilized to control the initial lifting of the combing wheels. The blocks 66 are similar to the blocks 41 but have only one suction port 45. The blocks are connected to rock shafts 67 by links 68 and levers 69. The levers are keyed to the shafts 67 and are pivotally connected with the links 68. The ports 45 are connected with the source of vacuum by hose connections 70, and when the tail edge of the topmost sheet is advanced sufficiently far that it passes the abrupt vertical walls 44, it will be free to snap up against the inclined walls 43 in response to the suction at the ports.

This sealing of the ports 45, however, does not effect the lifting of the combing wheels off of the bank. On the contrary, they continue to move the sheet forwardly pulling the blocks 66 along with it. As a consequence, the shafts 67 are rocked on their axes to swing levers 71 which are keyed to the shafts, in a clockwise direction, with respect to Figure 9. The levers 71 are connected to levers 72 so that as the blocks 66 are pulled along by the advancing sheet to cause the shafts to rock, the levers 71 will cause the levers 72 to rock with them a predetermined distance sufficient to engage pads 73 on the levers 72 over suction ports 74 in adjustable mounting members 75. The suction ports 74 are independently connected to a source of vacuum by hose connections 76, and closing of these ports effects

the lifting of the combing wheels by the suction responsive means 16.

The shafts 67 are carried by arms 77 fixed to a stationary shaft 78 at opposite sides of the machine, and a common bearing 77, also fixed to the shaft 78 and in which their inner ends are journaled. Carriers 79 slidably carried by the adjustable mounting members 75 are provided to support the ends of the shaft 78. Also mounted in the sliding carriers 79 is a shaft 80 having rollers 81 mounted thereon. The rollers 81 ride upon the top of the bank of sheets S and thus support the construction just described at its proper elevation to maintain the blocks 66 correctly associated with the topmost sheet.

After the ports 74 have been closed and the suction responsive means has lifted the combing wheels, the drop rolls 8 are lowered to withdraw the sheet from the blocks 66. This allows the blocks to be swung back to their normal positions by springs 82 pulling on the levers 71, where they then act as tail clamps. The combing wheels, however, do not immediately drop down onto the bank, cams A being provided to mechanically hold them up for a sufficient time to allow the topmost sheet to be withdrawn.

Two shafts 67 are employed so as to allow the two sheet engaging units to function independently of each other in the event a sheet moves forwardly with one side edge in advance of the other. In this instance, the combing wheel acting on that side of the sheet which is foremost is lifted off of the bank while the other combing wheel continues to comb the sheet and thereby straightens the same.

Cams 83 and 84 may be employed to open and close valves 85 and 86, respectively, which control the suction ports 45 and 74, respectively.

The valves 85 and 86 are so actuated by their respective cams that the suction is shut off after the cam A has operated to mechanically hold the combing wheels in their raised positions, and is again made available in ample time for the next succeeding sheet to be fed.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art to which this invention appertains, that this invention provides improved means for controlling the lifting of a sheet combing separator from the bank of sheets in a continuous type of sheet feeder, for holding the second sheet against movement during the withdrawal of the topmost sheet from the bank, and for enabling the feeding of sheets to the press in overlapped relationship.

What we claim as our invention is:

1. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above said table, of means for lifting the separator from the bank of sheets, pneumatic means controlled by the topmost sheet for actuating said lifting means, and a suction port adapted to be uncovered by the advance of the topmost sheet for holding the second sheet down on the pile during withdrawal of the topmost sheet from the pile.

2. In a sheet feeding machine, the combination with a feed table over which a bank of sheets is conveyed, and a sheet combing separator operating above said table upon the bank of sheets, a suction port adapted to be closed by the topmost sheet of the bank upon being advanced a predetermined distance, another suction port adapted to be uncovered by such advance of the top-

most sheet and to be closed by the next adjacent sheet, pneumatically operable means controlled by the first named suction port for lifting the separator from the bank of sheets, and means synchronized with the advance of the sheets for connecting the second named suction port with a source of vacuum.

3. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above the table, pneumatically operable means controlled by the advance of the topmost sheet of said bank for lifting the separator from the bank, and a suction port adapted to be uncovered by the same advance of the topmost sheet and operable directly on the next adjacent sheet for holding the next adjacent sheet against movement during withdrawal of said topmost sheet from the bank.

4. In a sheet feeding machine, the combination with a feed board adapted to support a bank of sheets and a sheet combing separator operating above said board, of mechanism for lifting the separator from the bank of sheets on the board, said mechanism being pneumatically operable, and a suction port mounted with its mouth forming substantially a continuation of the feed board at the delivery edge thereof so as to lie directly in the path of the most advanced sheet of said bank as it is advanced along said board to be closed by said sheet upon a predetermined advance thereof for controlling the functioning of said lifting mechanism.

5. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above the table and movable to and from engagement with the bank of sheets, of mechanism for lifting the separator off of the bank of sheets including a suction responsive means and a suction line for connecting said means with a source of vacuum, and a normally open port communicated with said suction line and having sufficient capacity to render the suction in said line ineffective to operate the suction responsive means, and said port being mounted so as to form substantially a continuation of the discharge end of the table to be covered by the leading edge portion of the foremost sheet moving thereover and resting thereon as it is advanced to discharging position whereby advance of said sheet to its initial discharging position effects the operation of the lifting mechanism to lift the separator off of the bank of sheets.

6. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above the table and engageable with the top of the bank to advance sheets past one edge of the table, of mechanism for lifting the separator from the bank of sheets, pneumatically responsive means for actuating said mechanism, and a suction port connected with said pneumatically operable means for controlling the functioning thereof and mounted at said edge of the table with a surface thereof in line with the table which surface has a port adapted to be closed by a sheet projected beyond said edge of the table whereby the advance of said sheet to project its leading edge portion beyond the table initiates the functioning of said lifting mechanism.

7. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets to be advanced and singly removed from

said table and a sheet combing separator operating above the table, of mechanism for lifting the separator, pneumatic means for actuating the lifting mechanism, a block having a surface thereof spaced from a surface upon which the block rests and having a suction port opening to said upwardly spaced surface of the block, said suction port being connected with the pneumatic means, and means for holding said block in a position resting on the top of the bank of sheets at a point where advance of the topmost sheet to a predetermined discharging position disposes the tail edge portion of said topmost sheet in line with the suction port to close the same and initiate functioning of the lifting means.

8. In a sheet feeding machine having a feed table to support a bank of sheets and a sheet combing separator operating above the table, pneumatic means for lifting the separator from the bank of sheets, and means to control the functioning of the lifting means comprising a block resting on the top of the bank of sheets and having a surface spaced from the supporting portion of the block to provide a hollow in the underside of the block opening to one side of the block so as not to be closed by the bank of sheets on which the block rests, and said block having a suction port opening to said wall adapted to be closed by a sheet drawn up against said wall upon alignment of an edge portion of the sheet with said wall.

9. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above the table, pneumatic means for lifting the separator from the bank of sheets, and means for controlling the functioning of the lifting means comprising a block resting on top of the bank of sheets and having an undercut portion with a suction port opening to said undercut portion and connected with the pneumatic means, said undercut portion being open to the atmosphere and having an abrupt wall past which the tail edge portions of the topmost sheets move in their advance over the feed table so that said tail edge portions of the sheets may be drawn upwardly to close the suction port upon passage thereof past said abrupt wall.

10. In a sheet feeding machine of the character described, suction controlling means co-operable with the top sheets of a bank as they are drawn past said controlling means, comprising a block adapted to rest on a bank of sheets and having an undercut portion providing an inner surface having an open suction port therein and an abrupt wall leading to said inner surface so that sheets moved under the block are held from flatwise movement toward the inner surface until their trailing edges pass said abrupt wall.

11. In a sheet feeding machine of the character described, suction controlling means co-operable with the top sheets of a bank as they are drawn past said controlling means, comprising a block having a flat bottom surface adapted to rest on a bank of sheets and having a substantially V-shaped transverse groove in its bottom surface to provide an inner inclined surface and an abrupt wall forming a step from the bottom surface to said inclined inner surface, said block also having a suction port opening to said inclined inner surface, the ends of said V-shaped groove being open so that the suction port is normally open to be closed by the tail edge portions of the sheets drawn along

under the block in a direction from the abrupt wall of the groove toward the opposite side of the groove.

12. In a sheet feeding machine of the character described, suction controlling means co-operable with the top sheets of a bank as they are drawn past said controlling means, comprising a block having a bottom surface adapted to rest upon a bank of sheets and having a suction port arranged with its mouth spaced above said bottom supporting surface to be normally open and to be closed only when a sufficiently flexible portion of a sheet aligned therewith is drawn up against the mouth of the port.

13. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above the table, of suction means to lift the separator, a block resting on the top of the bank of sheets near the tail edge of the topmost sheet when the same is in position near the discharge end of the table, said block having an open suction port adapted to be closed by the tail edge portion of the topmost sheet as the same is drawn into alignment therewith, means for connecting said suction port with the pneumatic lifting means so that closure of the port initiates the functioning of the lifting means, and the block having a second suction port adapted to be uncovered by the advance of the topmost sheet into its position closing the first named suction port so that suction at said second named suction port is effective upon the next adjacent sheet to hold the same while the topmost sheet is being withdrawn from the bank.

14. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above the table, of suction means to lift the separator, a block resting on the top of the bank of sheets near the tail edge of the topmost sheet when the same is in position near the discharge end of the table, said block having an open suction port adapted to be closed by the tail edge portion of the topmost sheet as the same is drawn into alignment therewith, means for connecting said suction port with the pneumatic lifting means so that closure of the port initiates the functioning of the lifting means, and the block having a second suction port adapted to be uncovered by the advance of the topmost sheet into its position closing the first named suction port so that suction at said second named suction port is effective upon the next adjacent sheet to hold the same while the topmost sheet is being withdrawn from the bank, means for connecting said second named suction port with a source of suction, and means coordinated with the operation of the machine for controlling the connection of the second named suction port with the source of suction.

15. In a sheet feeding machine, the combination with a feed board adapted to support a bank of sheets and sheet combing separator operable above the feed board, pneumatically operable means for lifting the separator from the bank of sheets, a suction shoe having a port adapted to be closed by the topmost sheet of said bank upon a predetermined advance of said sheet connected with the pneumatically operable lifting means to control the functioning thereof, and means for lifting a sheet off the suction shoe

to allow another sheet to be advanced into a position closing the port therein.

16. In a sheet feeding machine, the combination of a sheet combing separator operable upon a bank of sheets to separate the topmost sheet therefrom, means to convey sheets from the separator to a machine to be fed, control means engageable by the leading edge portion of a sheet to effect disengagement of the sheet combing separator from the bank, and means to move the trailing portion of a sheet out of engagement with said control means to allow the next successive sheet to be advanced past such trailing portion for operative engagement with said control means and thus effect overlapped travel of the sheets from the separating means to the machine being fed.

17. In a sheet feeding machine, a suction shoe having a suction port, means to advance a sheet into position closing the suction port, means to continue the advance of the sheet past the suction shoe, and means to clear the trailing portion of a sheet away from the suction shoe before it passes the same to make way for a successive sheet and enable overlapped advance of the sheets to and from the suction shoe.

18. In a sheet feeding machine, sheet separating means including a part to which sheets are advanced in overlapped relationship, means to continue the advance of the sheets past said part, and means to clear the trailing portion of a sheet from said part before it passes the same to make way for a successive sheet and enable overlapped advance of the sheets from as well as to said part of the sheet separating means.

19. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above said table, of means for lifting the separator from the bank of sheets, pneumatic means for actuating said lifting means, and means engageable with the topmost sheet and movable linearly therewith in its direction of advance for rendering said pneumatic means operable to actuate the lifting means.

20. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a pair of sheet combing separators operating above said table to advance the sheets, independent lifting means for each of the separators to lift them independently from the bank of sheets, separate pneumatic control means for actuating said lifting means, and independent means cooperable with the topmost sheet and each adapted to be separately drawn along with such sheet as it advances for rendering said pneumatic means operable to initiate the actuation of the lifting means whereby one of the separators may be lifted from the bank of sheets while the other remains on the bank to continue its advancing function.

21. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above said table, of means for lifting the separator from the bank of sheets, pneumatic means for actuating said lifting means, means engageable by the topmost sheet and movable thereby in the direction of the advance of such sheet, and means operable upon a predetermined

movement of said last named means to render said pneumatic actuating means operable.

22. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above said table, of means for lifting the separator from the bank of sheets, pneumatic means for actuating said lifting means, means engageable by the topmost sheet in such a manner that the sheet is pneumatically held thereto whereby movement of the sheet causes said last named means to be moved by the sheet, and means operable upon a predetermined motion of the last named means to render said pneumatic actuating means operable.

23. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above said table, of means for lifting the separator from the bank of sheets, pneumatic means for actuating said lifting means, including an air line having a normally open port, said pneumatic means being inoperable as long as said port is open, and means movable by and along with the topmost sheet in its direction of advance for closing the port to render said pneumatic means operable to actuate said lifting means.

24. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above said feed table, of pneumatic means to lift the separator from the bank of sheets including an air line having a normally open port, said pneumatic means being inoperable while said port remains open, and means adapted to be pneumatically held to the topmost sheet and moved thereby for closing the port to render said pneumatic means operable.

25. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above said table to advance the sheets, of a tail drag operable on the topmost sheet and having a limited motion therewith, means for lifting the separator from the bank of sheets, and means responsive to predetermined motion of the tail drag with a sheet for initiating the functioning of the lifting means.

26. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above said table to advance the sheets, of a tail drag operable on the topmost sheet and having limited motion therewith, and means operable upon predetermined motion of the tail drag with the topmost sheet for lifting the separator from the bank of sheets.

27. In a sheet feeding machine, the combination with a feed table adapted to support a bank of sheets and a sheet combing separator operating above said table to advance the sheets, a pneumatic tail drag engageable with the topmost sheet and adapted to have the sheet pneumatically held thereto so that movement of the sheet causes movement of the tail drag, and means operable upon predetermined motion of the tail drag with the topmost sheet to effect lifting of the separator from the bank of sheets.

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