No. 814,522. PATENTED MAR. 6, 1906.

T. C. DEXTER & H. HALLSTREAM.

SHEET HANDLING MACHINERY FOR PRINTING PRESSES AND OTHER MACHINES.

APPLICATION FILED DEC. 29, 1903.

4 SHEETS—SHEET 1.

FIG. 1.

FIG. 2.

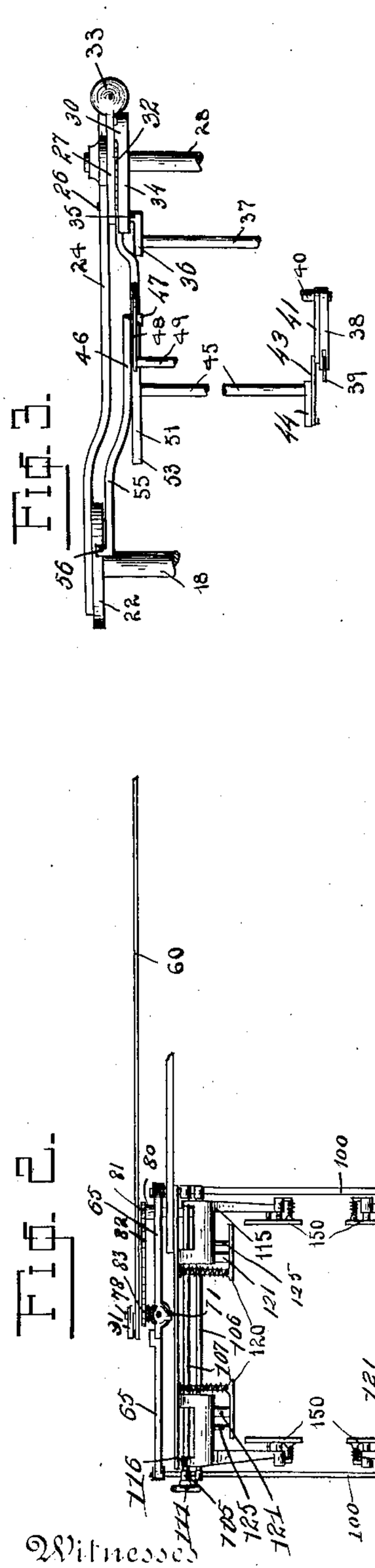


FIG. 3.

Witnesses:
J. Green
R. F. Tomsh

Talbot C. Dexter
Henry Hallstream,
Inventors

By their Attorneys Knight Bros.

No. 814,522. PATENTED MAR. 6, 1906.

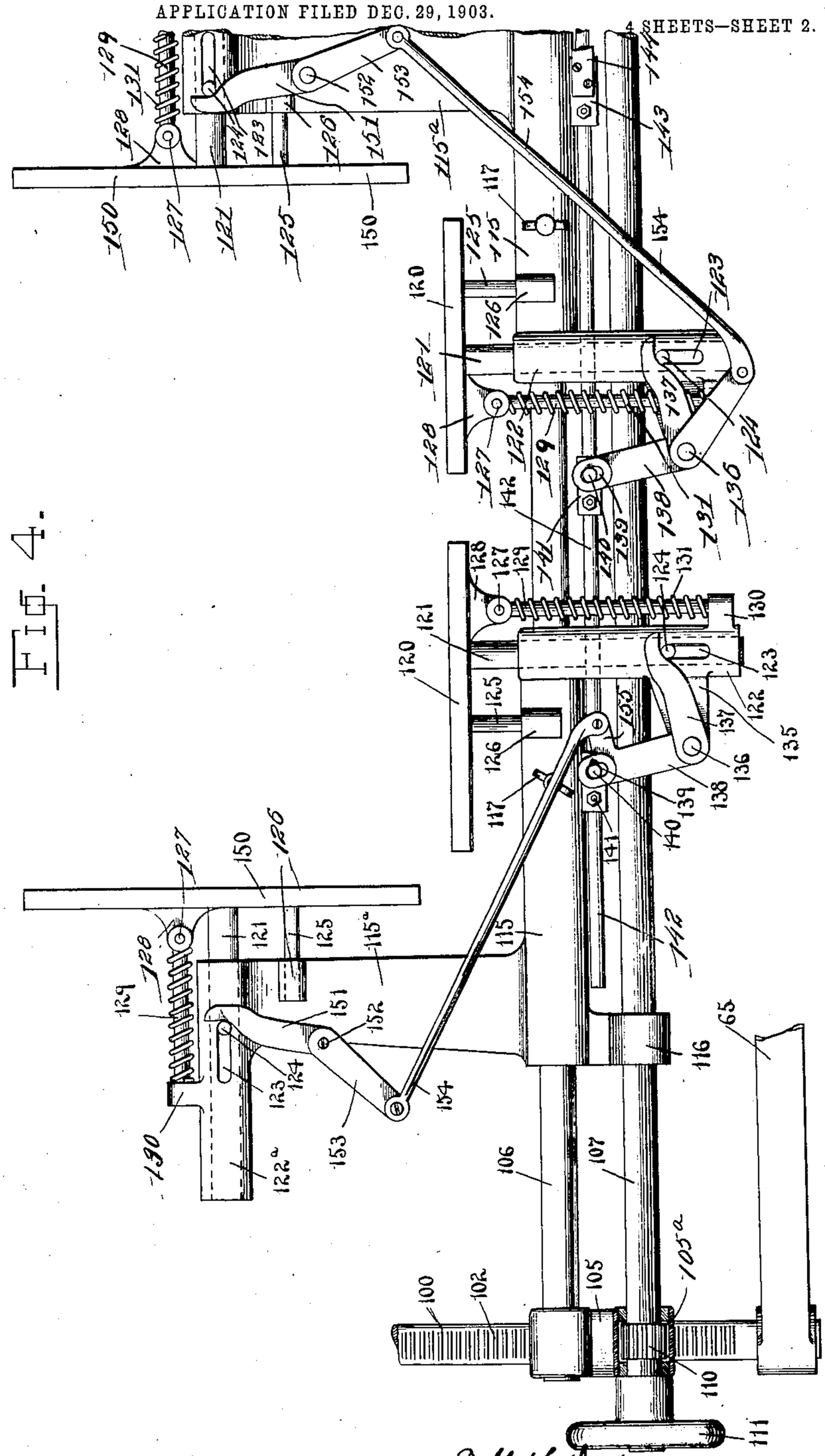
T. C. DEXTER & H. HALLSTREAM.

SHEET HANDLING MACHINERY FOR PRINTING PRESSES AND OTHER MACHINES.

APPLICATION FILED DEC. 29, 1903.

4 SHEETS—SHEET 2.

FIG. 4.



Witnesses
J. Green
P. F. Fornek

Talbot C. Dexter and
Henry Hallstream Inventors
By their Attorneys
Knight Bros

No. 814,522. PATENTED MAR. 6, 1906.

T. C. DEXTER & H. HALLSTREAM.

SHEET HANDLING MACHINERY FOR PRINTING PRESSES AND OTHER MACHINES.

APPLICATION FILED DEC. 29, 1903.

4 SHEETS—SHEET 3.

Fig. 5.

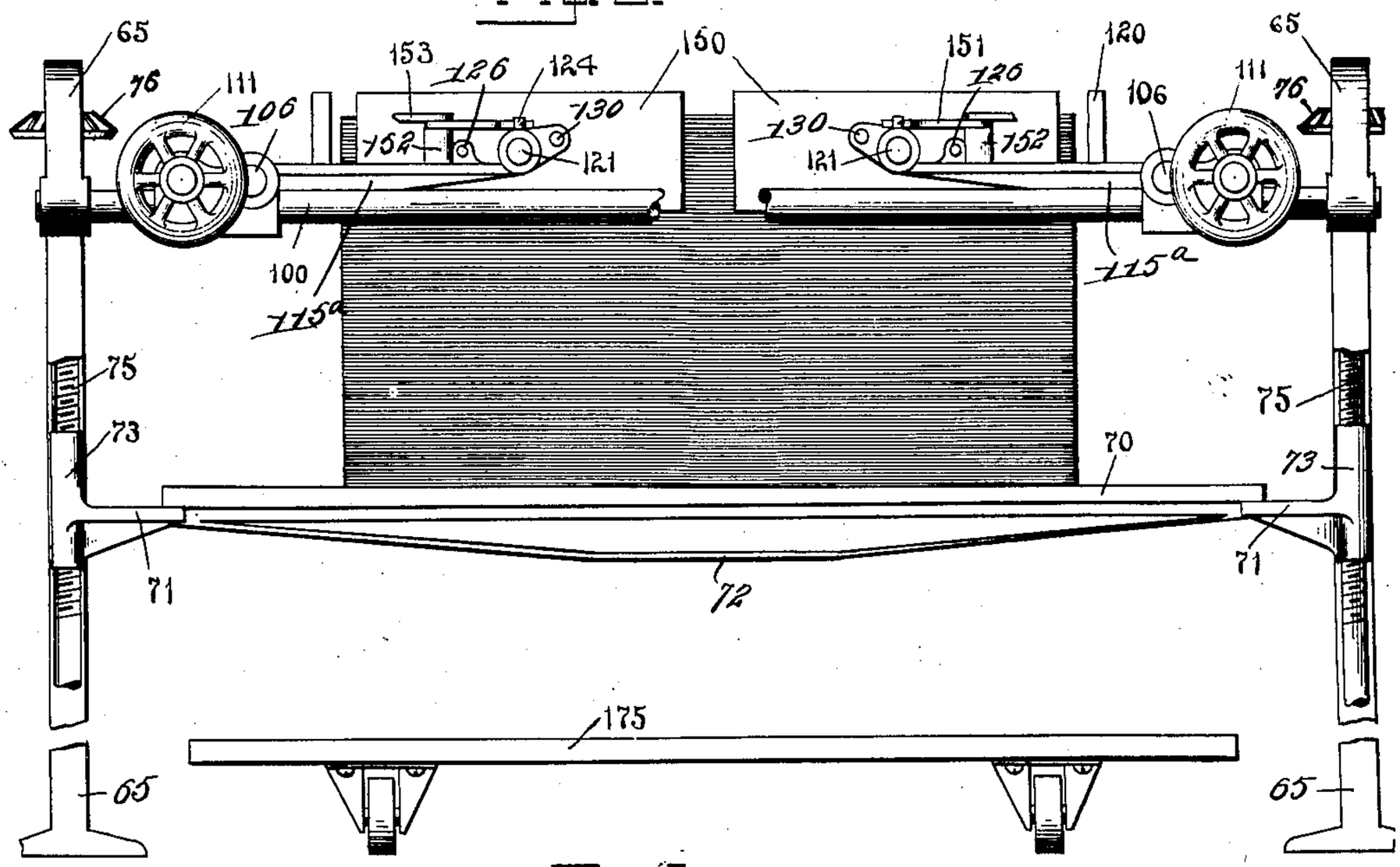


Fig. 6.

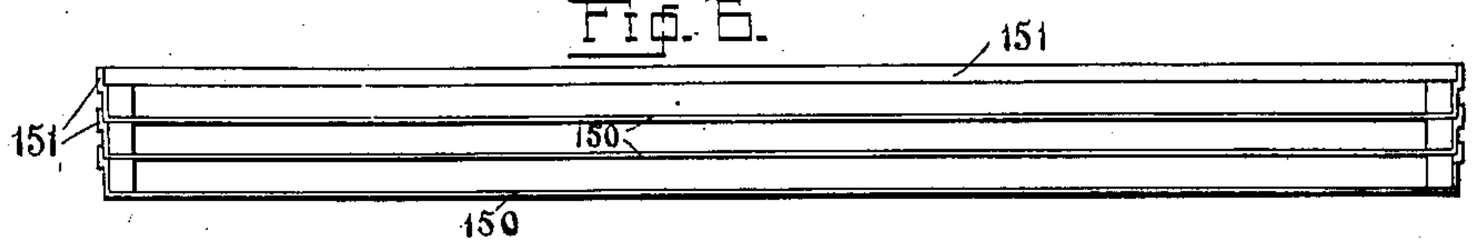


Fig. 7.

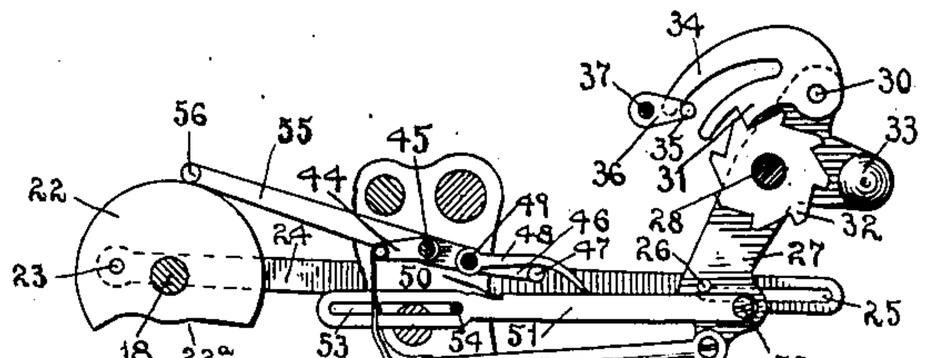
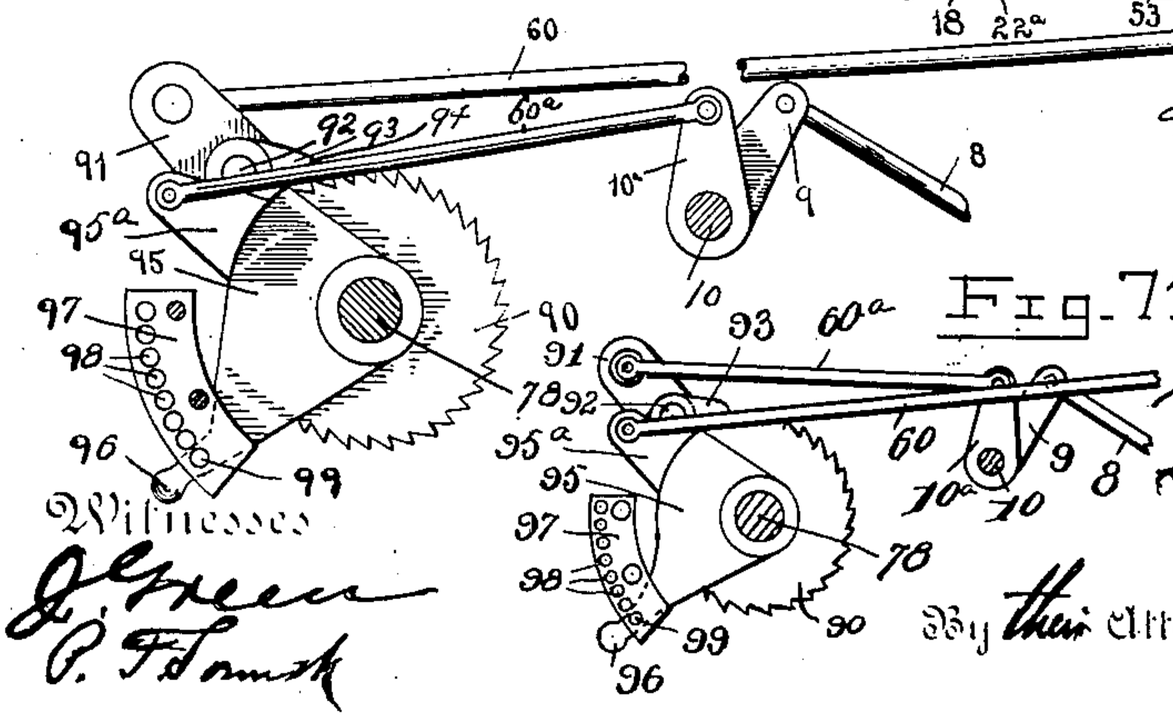


Fig. 7a.



Witnesses
L. Greene
P. F. Smith

Talbot C. Dexter and Henry Hallstream
Inventors,
By their Attorneys Knight Bros

No. 814,522. PATENTED MAR. 6, 1906.

T. C. DEXTER & H. HALLSTREAM.

SHEET HANDLING MACHINERY FOR PRINTING PRESSES AND OTHER MACHINES.

APPLICATION FILED DEC. 29, 1903.

4 SHEETS—SHEET 4.

Fig. 8.

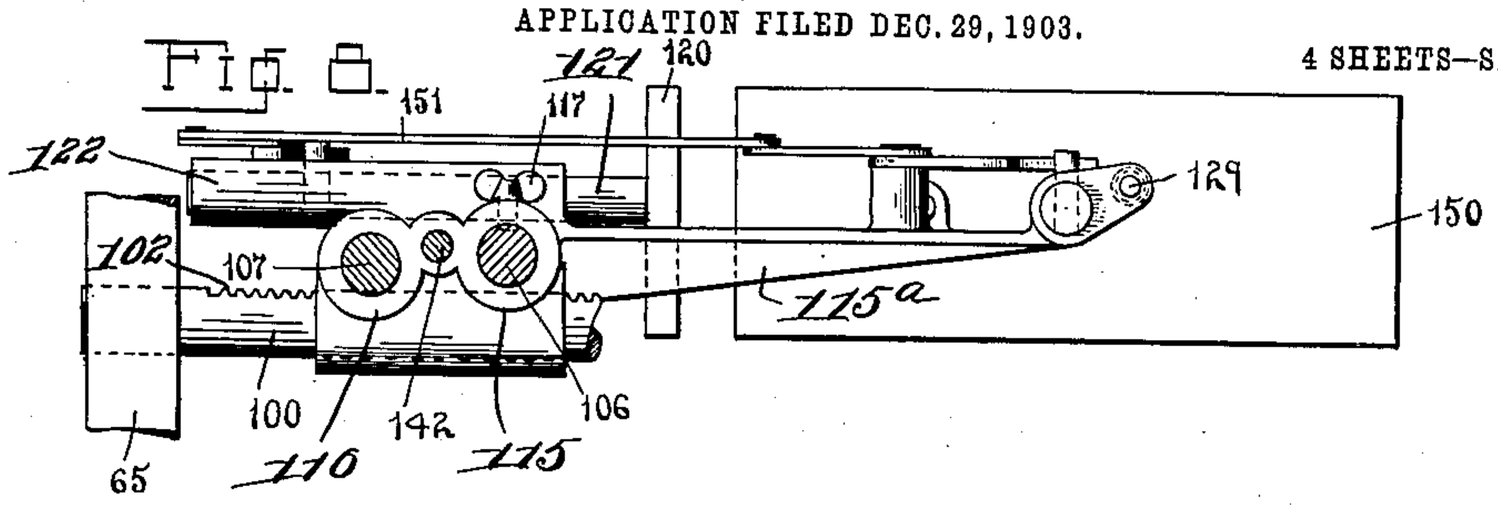


Fig. 9.

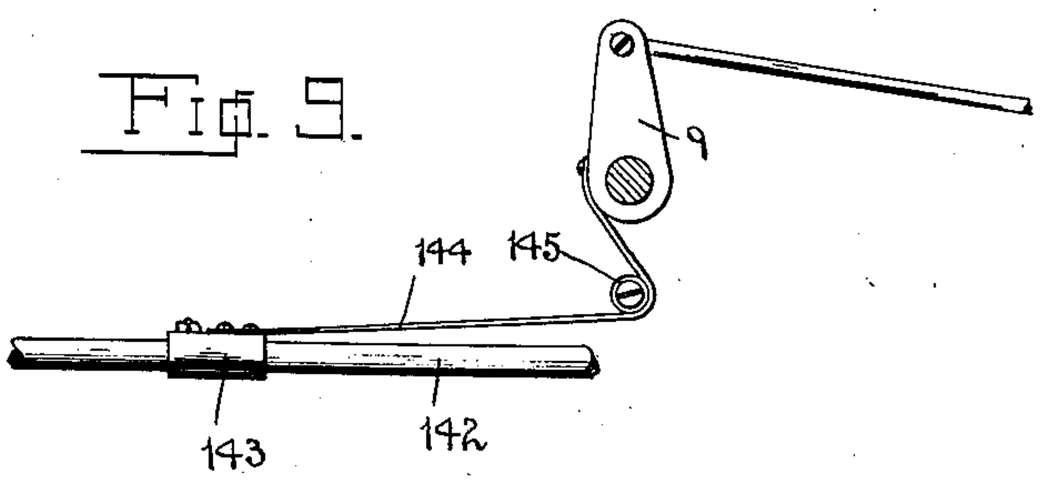


Fig. 10.

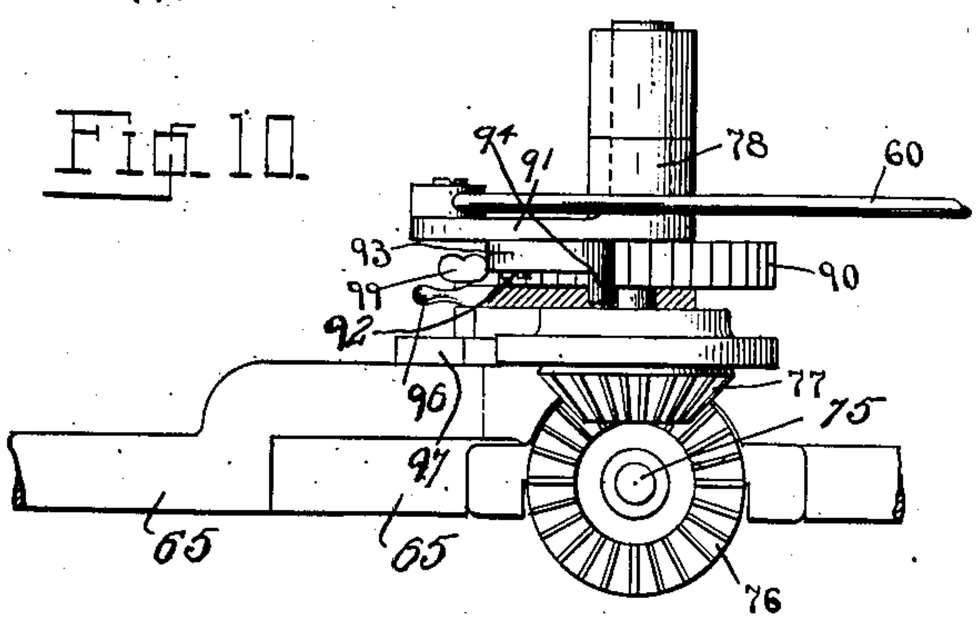


Fig. 11.

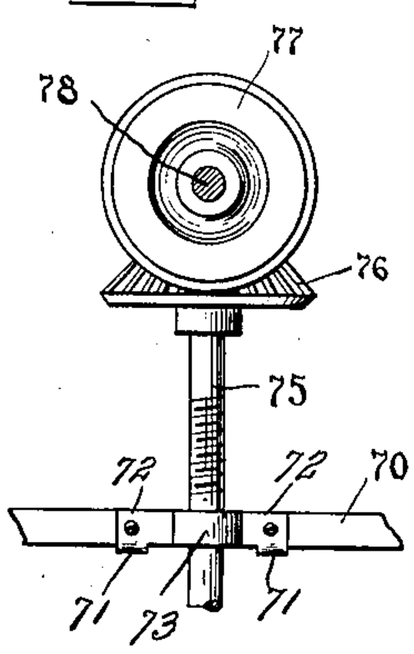
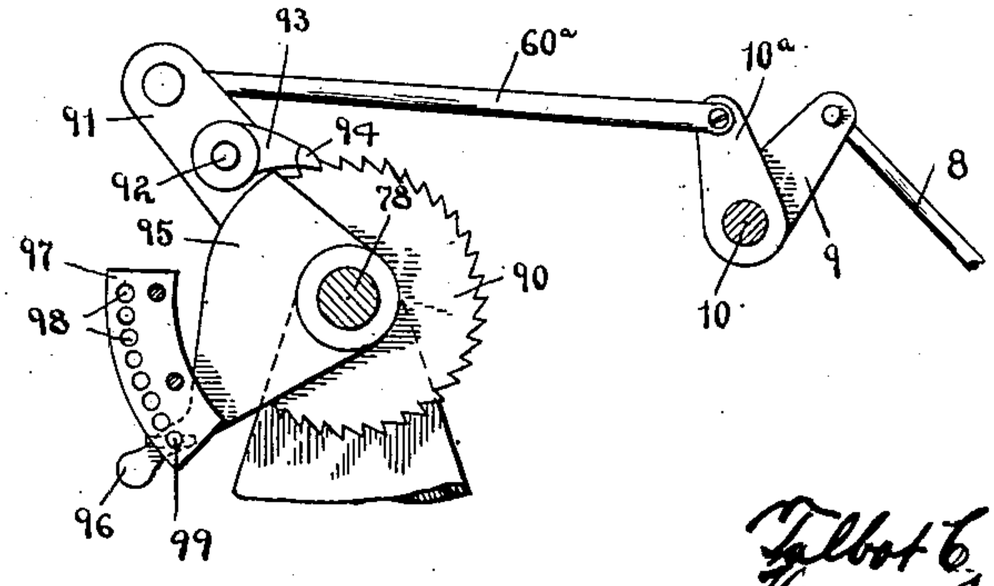


Fig. 12.



Witnesses
J. Green
C. F. Tomsk

Talbot C. Dexter and
Henry Hallstream
Inventors,

By their Attorneys
Knight Bros.

UNITED STATES PATENT OFFICE.

TALBOT C. DEXTER AND HENRY HALLSTREAM, OF PEARL RIVER, NEW YORK; SAID HALLSTREAM ASSIGNOR TO SAID DEXTER.

SHEET-HANDLING MACHINERY FOR PRINTING-PRESSES AND OTHER MACHINES.

No. 814,522. Specification of Letters Patent. Patented March 6, 1906.

Application filed December 29, 1903. Serial No. 187,015.

To all whom it may concern:

Be it known that we, TALBOT C. DEXTER and HENRY HALLSTREAM, citizens of the United States, residing at Pearl River, in the county of Rockland and State of New York, have invented certain new and useful Improvements in Sheet-Handling Machinery for Printing-Presses and other Machines, of which the following is a specification.

Great progress has been made in the art of machinery for handling and operating upon sheet-paper, and particularly in automatically-controlled feeding-machines for rapidly supplying successive sheets to a printing-press, folding-machine, ruling-machine, or other machine designed to operate upon paper. Feeding-machines as now practically operated are adapted to receive a large stack or pile of sheets of paper upon an automatically-elevated table or support and feed the successive sheets from the pile to the machine which is to operate upon the same. This automatic machine which continuously operates upon a large pile is of great value in the art because of the long run which it is enabled to make without material attention from the operator.

While the mechanism for rapidly feeding sheets of paper to printing-presses or other machines has been perfected to a great extent, the mechanism for receiving sheets from the press or other machine has not advanced to the same degree of perfection, and in the most enterprising publishing-houses to-day the delivery of a printing-press or other machine is made upon an ordinary stationary table or "fly-board," which is adapted to receive a comparatively small proportion of the stack of sheets which is accommodated in the feeding-machine. The printed sheets are periodically removed from the delivery-table or fly-board by an attendant and stacked by hand in a suitable place, and because of the inability of the delivery-table or fly-board to satisfactorily accommodate and keep in order a large pile of sheets it is necessary that the attendant give his constant attention to the removal of the delivered sheets to prevent the building up of a pile too large for the proper operation of the delivery mechanism of the press.

To obviate the necessity of the constant attention of an attendant to the delivery of a press or other machine, it has heretofore been proposed to provide an automatically-lowering receiving-table for the press, which gradually descends as the pile of sheets builds up upon the table. Such mechanisms have never gone largely into use for the reason that they have not satisfactorily accomplished the result for which they were designed. In view of this undeveloped condition of the receiving mechanism for sheets which are delivered from printing-presses and such machines we have devised the improvements in sheet-handling machinery, as hereinafter pointed out.

The first feature of novelty in our present invention comprises a sheet-receiving table operated by a suitable lowering mechanism under the control of devices which may be adjusted by hand or automatically by a part of the printing-press or other machine which delivers the sheets or by the feeding-machine which supplies the sheets to the printing-press or other machine. This lowering mechanism for the receiving-table comprises, preferably, the same form of vertical feed-screws operating through nuts secured to the table as in the automatically-controlled elevating-table of the paper-feeding machine. The screws are intermittently rotated for lowering the table the desired amount as the sheets pile up upon it, and the means for rotating said screws is preferably a pawl and-ratchet mechanism which may be actuated by a suitable connection with the delivery mechanism of the press or by a connection with the operating mechanism of the table-elevating means of the paper-feeding machine. In addition to the operation of the screws which gradually lower the receiving-table we prefer to provide means for controlling the amount of each lowering step or action. This controlling means may be in the form of a controller-plate arranged to operate upon the actuating-pawl for controlling the length of its active stroke. This controller-plate may have means for adjusting its position by hand with a suitable locking device for holding it in the desired adjusted position, or it may be connected through suitable means with the governor or controller of the paper-feeding-machine table, so as to regulate the amount of lowering of the receiving-table in proportion to the amount of elevation of the feed-table. In this latter suggested arrangement of controlling the movement of the receiving-table

from the governor which controls the elevation of the feed-table it will of course be clear that the receiving-table must be lowered more rapidly than the feed-table for the reason that the pile of sheets which have passed through the printing-press will be higher than the pile of the same number of sheets on the feeding-machine, because of the embossing effect of the printing operation and of the presence of more or less air between the sheets which are piled up by the delivery of the press. This difference in the height of the pile of sheets before and after printing is easily accommodated by arranging for the lowering of the receiving-table more rapidly than the movement of the feed-table, as by differential gearing.

The second feature of novelty in our present invention comprises the combination, with an automatically-lowering receiving-table, of sheet-jogging devices mounted upon a frame above and independently of the lowering receiving-table, with means for operating said jogging devices, so that as the sheets pile up upon the receiving-table and the table automatically moves downwardly to accommodate the increasing pile the jogging devices will remain at the same elevation, so as to continually operate upon the upper series of sheets of the increasing pile, thereby keeping the pile straightened up. This feature of the automatically-lowering receiving-table with the independently-supported jogging devices, so as to maintain the jogging devices in operative relation with the top of the constantly-increasing pile of sheets, is of the utmost importance in facilitating the rapid and accurate handling of delivered sheets.

The automatically-controlled lowering sheet-receiving table with jogging devices, as just referred to, enables us to further extend our plan of facilitating the handling of sheets for printing-presses and other machinery in case it is desired to print or otherwise operate upon both surfaces of the sheets, since the once-printed sheets are received upon the lowering delivery-table from the delivery "fly" mechanism of the press in just the reverse order in which they were fed into the press and are accurately piled in readiness to be fed to the press which is to print the opposite surface.

This brings us to the third feature of novelty in our present invention, which comprises the employment of an open-front framework in which the lowering delivery-table operates, the open front of the framework allowing for the introduction of a suitable truck beneath the table to allow the table to be lowered upon the truck in readiness to be wheeled out from the delivery-machine to the feeder. In this arrangement the receiving-table will consist of a skeleton framework having table-supporting flanges and lowered by the screws and a removable delivery-board resting upon said flanges, so that the skeleton framework will be lowered around the truck and out of engagement with the delivery-board, leaving the board, with the supported pile of sheets, resting upon the truck, so as to allow the pile of sheets to be readily moved away on the truck. A further extension of this plan involves the use of sheet-receiving boxes or trays similar to those now employed in printing-houses for receiving printed sheets of fine work, each tray or box being usually of the proper size to accommodate about two hundred and fifty sheets. When these separate trays or boxes are employed in connection with our improvements, it will be clear that in starting the operation of printing one of the trays or boxes is placed upon the delivery-board on the skeleton framework of the lowering table to receive the delivered sheets, and as the table is lowered and the desired number of sheets has been collected in the first tray or box a second tray is placed on top of the first, and this is filled in like manner. This operation continues until a stack of the filled trays or boxes has been collected on the lowering table, when they are automatically delivered upon the truck, which has been wheeled into place beneath the stack of boxes, and at the completion they may be wheeled off in the same manner as explained in connection with the delivery of sheets without the boxes. In this last-suggested arrangement it will of course be understood that the jogging devices could not be employed, since the trays or boxes would interfere with the jogging operation; but this is not detrimental, since the trays would themselves keep the sheets in sufficiently-accurate alinement.

In order that our invention may be fully understood, we will first describe the same with reference to the accompanying drawings and afterward point out the novelty with more particularity in the annexed claims.

In said drawings, Figure 1 is a side elevation of a printing-press equipped with an automatic paper-feeding machine and our improved automatically-controlled sheet-receiving mechanism. Fig. 2 is a detail plan view of the sheet-receiving mechanism, showing particularly the pile-jogging devices for maintaining the pile of delivered sheets in proper alinement. Fig. 3 is a detail plan view of the automatic governor which controls the elevation of the table in the paper-feeding machine and the lowering of the table in the sheet-receiving mechanism. Fig. 4 is a detail plan view, on a larger scale, showing part of the automatic sheet-jogging mechanism. Fig. 5 is a detail rear elevation of the sheet-receiving mechanism with parts broken away, showing the self-lowering delivery-table, the sheet-jogging mechanism, and the pile-conveying truck. Fig. 6 is a detail sec-

tional view of a series of sheet-receiving boxes. Fig. 7 is a detail view illustrating one form of mechanism for automatically controlling the lowering movement of the delivery-table from the pile-governor of the feeding-machine. Fig. 7ª is a detail view illustrating the same form of mechanism, in which the controlling-rods are transposed. Fig. 8 is a detail elevation of part of the sheet-jogging mechanism. Fig. 9 is a detail view illustrating the means for operating the sheet-jogging mechanism. Fig. 10 is a detail plan view of the mechanism for automatically controlling the lowering movement of the delivery-table. Fig. 11 is a detail elevation of the screw-gearing. Fig. 12 is a detail view illustrating a modification of the mechanism as shown in Fig. 7, the arm of the controller-plate being omitted.

For the purpose of illustrating our invention we have shown our improvements in Fig. 1 as applied to a Miehle printing-press of the flat-bed type, having a sheet-delivery mechanism arranged to deliver the successive sheets with the printed side up. This Miehle press is shown in a general way simply for the purpose of illustration, and we would have it understood at the outset that we do not limit ourselves to the application of our invention to any particular form of printing-press, ruling-machine, or other machine which is designed to operate upon sheets of paper and deliver the sheets in a pile upon a delivery-board. Our present invention may be applied with equal facility to other forms of printing-presses—such, for instance, as rotary cylinder-presses and presses having the ordinary oscillating delivery-fly, which delivers the sheets from the press to a fly-board with the printed side down.

In Fig. 1 of the drawings, 1 represents the framework of a suitable printing-press; 2, the reciprocating form or bed; 3, the rotating impression-cylinder; 4, the feed-board; 5, the reciprocating delivery-carriage operating upon horizontal ways 6, and 7 a rotating crank connected, through rod 8, rock-arm 9, rock-shaft 10, rock-arm 11, and rod 12, with the delivery-carriage for reciprocating it in proper unison with the delivery of sheets from the impression-cylinder of the press. This form of printing-press is well known in the art and will not be further described, since the particular construction of press forms no part of the present invention.

Printing-presses are usually equipped with automatic paper-feeding machines for supplying the successive sheets to the feed-board of the press. 14 represents the framework of a paper-feeding machine of the Dexter type-15 is the automatically-controlled pile-supporting table or platform, which is raised and lowered by means of the vertical screws 16, arranged within the side frames and threaded through nuts 17, mounted on the side edges of the vertically-movable frame 15ª of the table 15 in a manner well understood in the art.

18 is the cam-shaft of the feeding-machine, driven from the vertical shaft 19 through bevel-gearing 20 and 21 in a manner well understood. This cam-shaft 18 has keyed to it at one end a combined controlling-cam and crank-disk 22, provided with a crank-pin 23, upon which is journaled at its forward end a reciprocating pitman 24, formed with a rear longitudinally-slotted end 25, in the slot of which operates a pin or lug 26, projecting from an oscillating pawl-carrying arm 27, journaled upon the cross-shaft 28 of the feeder. This shaft 28 is the one which is provided at its ends with the vertical bevel-gears, (not shown,) which mesh with the horizontal bevel-gears, (not shown,) secured to the upper ends of the vertical screws 16, which raise and lower the table or platform of the feeding-machine. The cam and crank disk 22, pitman 24, rock-arm 27, and ratchet-wheel 32 are arranged outside of the side frame of the feeder on the right-hand side of the machine. This rock-arm 27 projects upwardly beyond the cross-shaft 28 and has pivoted to its upper end at 30 a gravity-pawl 31, which rests in operative relation to a ratchet-wheel 32, keyed to the cross-shaft 28. From this construction it will be observed that the oscillation of rock-arm 27 causes the gravity-pawl 31 to rotate the shaft 28 step by step, to thereby elevate the pile-supporting table or platform. The rock-arm 27 has a rearwardly-projecting integral weighted arm 33, which tends to cause the lower end of arm 27, carrying pin 26, to move forwardly and follow the forward end of slot 25 of pitman 24. This action of rock-arm 27 also moves pawl 31 back over the ratchet-wheel 32 preparatory to another forward stroke. The pawl 31 is also formed with an integral forwardly-projecting curved arm 34, under which engages a pin or lug 35 on a rock-arm 36, extending from a hand-operated rock-shaft 37, suitably journaled in the machine-frame and having a handle (not shown) for operating it when it is desired to disengage the pawl from the ratchet-wheel. This is necessary when it is desired to quickly lower the table by hand or power after the pile is exhausted.

For the purpose of controlling the elevation of the table or platform 15 a governing mechanism is arranged to throw the table-elevating mechanism into and out of operation according to the height of the top of the pile of sheets. This governing mechanism is of the following construction: A rock-arm 38, carrying a freely-journaled pile-engaging roller 39, is mounted upon a short rock-shaft 40, journaled in the lower end of a central depending bracket-arm 41 of the machine-frame. A second rock-arm 42 projects forwardly from the short rock-shaft 40 and is

connected with the lower end of a rod 43, which projects upwardly and is pivoted at its upper end to a short rock-arm 44, secured to a rock-shaft 45, suitably journaled in the machine-frame and extending from one side to the center of the machine. This rock-shaft 45 carries a long lever 46 55, one arm 46 of which projects rearwardly and is formed with a lateral lug or projection 47, which rests directly beneath a gravity-dog 48, pivoted to the machine side frame at 49. This dog 48 is supported in position to engage a notch 50, formed in the upper edge of a reciprocating bar 51, which is pivoted at its rear end 52 upon the oscillating rock-arm 27 and is formed with a slotted forward end 53, in the slot of which operates a stationary guide pin or lug 54, projecting from the side frame.

Projecting forwardly from the rock-shaft 45 is the rock-arm 55, (forming the forward part of said long lever 46 55,) carrying at its free end an antifriction-roller 56, which operates upon the periphery of the controlling-cam 22 on cam-shaft 18 above referred to. This cam-disk 22 has a low portion 22^a, into which roller 56 drops once every revolution of shaft 18, the weight of arms 38, 42, 44, and 55 and rod 43 being sufficient to cause roller 56 to closely follow the periphery of cam 22, except when held out of the low portion 22^a by the engagement of the roller 39 with the pile.

In the normal operation of the paper-feeding machine equipped with the above-described automatically-controlled table-elevating mechanism the antifriction-roller 56, carried by arm 55, rides upon the high portion of cam 22 during three-quarters of every revolution of shaft 18, with the result that during said period of a revolution the pile-engaging roller 39 is held up out of engagement with the top of the pile of sheets, and the dog-releasing pin or lug 47 is held down out of contact with the dog 48, so as to allow dog 48 to ride upon the moving bar 51 and, under certain conditions, engage the notch 50 to hold said bar against movement. During the remaining one-quarter of each revolution of the shaft 18 the anti-friction-roller 56 of arm 55 tends to drop into the low portion 22^a of the controlling-cam 22 for the double purpose of allowing the pile-engaging roller 39 to touch and gage the height of the pile of sheets and to disengage the dog 48 from notch 50 of bar 51 in case the top of the pile has become lowered to a sufficient extent to render it desirable to further elevate the pile. If when the roller 56 reaches the low portion 22^a of the controlling-cam 22 the top of the pile is still at the required height for feeding purposes, the engagement of roller 39 with the top of the pile will prevent the roller 56 from dropping to the extreme low point of the controlling-cam and will limit the movement of the lever 46 55 to such an extent that the lug 47 will not reach the dog 48, and hence the dog 48 will be allowed to remain in engagement with the notch 50 of the reciprocating bar 51. If during any revolution of the shaft 18 the top of the pile has reached the limit of its low position at which the feeding-off devices will operate properly, then when the antifriction-roller 56 reaches the low portion 22^a of the controlling-cam it will drop into said low portion to a sufficient extent (by reason of the lowering of the pile-engaging roller 39 to a sufficient extent) to elevate the pin or lug 47 into engagement with the dog 48 to disengage the dog 48 from the notch 50 in the bar 51. The result of this operation will be the release of bar 51, which will allow the rock-arm 27 to follow the pitman 24 forwardly, drawing back the pawl 31 over the ratchet-wheel 32 in readiness for a feeding stroke, which is accomplished by the return or rearward movement of pitman 24, actuated by the cam-crank disk 22. This action will be repeated for each revolution of shaft 18 until the top of the pile is raised sufficiently to hold pin 47 down away from dog 48, which will again insure the engagement of dog 48 with notch 50 of bar 51. It will be clear that for every revolution of the shaft 18 the pitman 24 is moved forwardly and backwardly, and in case the pawl-carrying arm 27 is held out of operation by the engagement of dog 48 with bar 51 the slot 25 of pitman 24 will simply ride back and forth upon the pin 26 of the rock-arm 27, allowing rock-arm 27 to remain still.

60 is a rod journaled to the lower end of the pawl-carrying rock-arm 27 of the feed-table-elevating mechanism and projecting longitudinally of the printing-press to the delivery-receiving mechanism for automatically controlling the operation of the receiving-table under conditions which will presently be explained.

It is at present the common practice in the art to deliver sheets from a printing-press, ruling-machine, or other similar machine directly upon a stationary fly board or table. These delivery boards or platforms are frequently provided with automatically-operated sheet-jogging mechanisms for keeping the pile in alinement to facilitate the subsequent handling of the sheets. In all delivery mechanisms in which sheet-jogging devices are employed it has been the custom to mount the sheet-joggers directly upon the fly board or platform, so that the number of sheets that can be straightened in a stack or pile upon the delivery-board is limited by the vertical dimensions of the sheet-jogging boards, since such jogging mechanisms are immovable in a vertical direction and cannot be adjusted to suit the increasing height of a pile. This limitation of the delivery and jogging mechanisms as now commonly employed necessitates the constant attention of the attendant, who must remove the small piles of

sheets from time to time in order to insure the proper operation of the jogging devices and also to prevent the interference of the operation of the delivery mechanism of the press.

One of the most important features of our present invention is the combining, with a self-lowering receiving-table for a printing-press or similar machine, of suitable sheet-jogging devices mounted on a support independently of the table, so that as the pile of sheets delivered gradually increases in height and the table automatically lowers to accommodate the increasing height of the pile the jogging devices will always remain in proper operative relation to the top of the pile of sheets, so that they can always operate upon the newly-delivered sheets to straighten them upon the pile, and thereby maintain the pile in alinement from the supporting-table to the final sheets delivered at the top. This mechanism will now be described.

65 represents one of the side frames of the sheet-receiving machine. The framework of the sheet-receiving mechanism is formed, preferably, of two side frames and a back frame rigidly connected and properly braced, the front frame being omitted for the purpose of forming an open front to facilitate the removal of the delivered pile of sheets from the machine by transferring the pile to an ordinary printer's truck, which is wheeled in through the open front beneath the table which supports the delivered pile of sheets.

70 is the self-lowering table or platform, consisting of a plain stout board. This table or platform 70 rests at its ends and rear side upon the inwardly-projecting horizontal brackets or flanges 71, formed on a skeleton frame 72, mounted to move vertically in suitable guideways formed in the delivery side frames 65. Nuts 73, secured to the skeleton, table-supporting framework, are threaded upon the vertical screws 75, which are journaled in the side frames in the same manner as the elevating-screws of the feeder-table. The upper ends of these screws 75 are provided with horizontal bevel-gears 76, which mesh with vertical bevel-gears 77, keyed to the short cross-shaft sections 78, which are journaled in the upper ends of the side frames 65. The shaft 78 is made in short sections, because if it were extended entirely across the sheet-receiving frame this would interfere with the delivery of sheets from the press to the receiving-board. At the rear edge of the receiving-frame 65, below the path of sheets delivered from the press, is journaled a cross-shaft 80, provided at its opposite ends with sprocket-wheels 81, around which run the sprocket-chains 82, extending up around the sprocket-wheels 83, keyed to the short shaft-sections 78. By means of the cross-shaft 80 and the sprocket-wheels and sprocket-chains the two short shaft-sections 78 are geared together so as to cause them to operate in unison. One end of the cross-shaft 80 may be provided with a crank-handle 85 for the convenient and rapid rotation of the shaft-sections 78 after the removal of a pile of sheets from the platform when it is desired to quickly elevate the receiving-table to its highest position in readiness to start the delivery of a new pile from the press. When the receiving-table is elevated by hand, the automatic mechanism for lowering it is of course thrown out of gear, so as not to interfere with the operation.

The means for automatically lowering the sheet-receiving table may be of any suitable construction; but we prefer to employ a mechanism similar to the operating means of the automatically-elevated table of the feeding-machine. This mechanism is shown particularly in Figs. 7, 7ª, 10, and 12 of the drawings. Referring to these figures of the drawings, 90 is a ratchet-wheel keyed to one of the short shaft-sections 78, and 91 is a rock-arm journaled upon said short shaft-section and having pivoted to it at 92 a small gravity-pawl 93, formed with a lateral integral controlling lug or finger 94. This pawl-carrying rock-arm 91 may be suitably connected with any operative part of the printing-press or feeding-machine which will give it the required oscillating motion. In Figs. 1, 7, and 10 we have shown the rock-arm 91 pivotally connected to the bar 60, extending from the pawl-carrying arm 27 of the feed-table-elevating mechanism. In Figs. 7ª and 12 we have shown said pawl-carrying arm 91 connected by a suitable rod or link 60ª with a rock-arm 10ª on the rock-shaft 10 of the press-delivery mechanism, and it will be perfectly clear that said arm 91 may be connected with any other part of the machine which will give it the necessary to-and-fro motion for actuating the table-lowering mechanism.

For controlling the active stroke of the pawl 93 upon the ratchet-wheel 90 we prefer to provide an adjustable controller-plate 95, freely journaled upon the shaft-section 78 alongside of the ratchet-wheel 90 and provided with a handle 96 by which it can be adjusted. A stationary plate 97, having a series of perforations 98, is supported adjacent to the handle 96, and a screw or pin 99 is removably mounted in the handle 96, so as to be inserted in any one of the perforations 98 to hold the controller-plate 95 in the desired adjusted position. The controller-plate 95 is arranged directly beneath the controlling lug or finger 94 of the pawl 93, so that when the controller-plate 95 is shifted the finger 94 will rest upon the controller-plate during a part of the stroke of the pawl 93, thereby holding the pawl disengaged from the ratchet for a part of its stroke and allowing it to ac-

tuate the ratchet-wheel 90 the required portion of the stroke to lower the receiving-table the proper amount.

In place of adjusting the controller-plate 95 by hand, as just described, it may be operated, when the screw or pin 99 is removed, from the rock-shaft 10 by connecting the rock-arm 10^a, through rod 60^a, with the arm 95^a of the controller-plate 95, as shown in Fig. 7 of the drawings, or we may operate said controller-plate 95 from the governor of the feeder-table by connecting rod 60 with the arm 95^a of the controller-plate 95 and operating the arm 91, as shown in Fig. 7^a of the drawings, from some other part of the machine, as by the rod 60^a, connected with the rock-arm 10^a, thereby regulating the proportion of active and inactive strokes of the pawl 93 by the automatically-controlled action of the feed-table-elevating mechanism.

It will be understood by those skilled in the art that the self-lowering receiving-table of the delivery mechanism must be lowered more rapidly than the feeder-table is elevated, for the reason that the sheets delivered from the press make a relatively higher pile than the sheets in the feeding-machine. The reason for this is the embossing effect of the printing and the presence of more or less air between the sheets of a newly-stacked pile. This difference in extent of movement of the receiving-table over the feeder-table can be readily provided for with our invention. In the form of mechanism in which the controller-plate 95 is adjusted by hand the operator can readily adjust the lowering action to suit the requirements according to his judgment after inspecting the delivery operation. In the form of mechanism in which controlling-plate 95 is automatically adjusted by the feed-table governor this differential action of the feed-table and receiving-table may be provided for by properly proportioning the ratchet-wheels which feed the two tables, or other suitable adjustments of parts may be arranged for.

Referring now particularly to Figs. 1, 2, 4, 5, 8, and 9 of the drawings, we will describe the independently-mounted sheet-jogging mechanism which coöperates with our automatically-controlled self-lowering table.

Secured in the upper ends of the side frame 65 of the sheet-receiving machine are the parallel cross-bars 100 and 101, which securely brace the frame of the receiving-machine and constitute the main support of the sheet-jogging mechanism. Each of the cross-bars 100 is formed with a series of rack-teeth 102 on its upper face adjacent to each end for the purpose which will presently appear. 105 is one of a series of four adjustable sliding brackets mounted upon supporting-bars 100 and 101 and connected in pairs. One of these adjustable brackets 105 is mounted adjacent to each end of each pair of the bars 100 and 101, and extending between brackets 105 at the adjacent ends of the two pairs of bars 100 and 101 are the longitudinal supporting bars or shafts 106 and 107, each pair of brackets 105 at each side of the machine being connected by two of the bars 106 and 107, thereby constituting two adjustable frames or carriages, one at each side of the machine, and each frame or carriage including two brackets 105 and a connecting pair of bars or shafts 106 and 107. Each of the bars 107 is provided at its opposite ends, within sockets formed in the brackets 105, with a gear 110, keyed to the bar 107 and meshing with the rack-teeth 102. One end of each bar 107 is also provided with a hand-wheel 111, by which the bar 107 can be rotated. It will be observed that as each bar 107 is provided with two gear-wheels 110, meshing with the rack-teeth 102 on the two supporting-bars 100 and 101, when the bars 107 are rotated by the hand-wheels 111 the frames or carriages 105 106 107 will be moved inwardly or outwardly upon the supporting-bars 100 and 101 to properly adjust the sheet-jogging devices carried thereby. The jogging devices proper are mounted upon four independently-adjustable brackets mounted upon the bars 106 and 107 of the adjustable frames or carriages just described. This adjustment of the frames or carriages inwardly and outwardly upon the main supporting-bars 100 and 101 enables the operator to place the two joggers at each side of the machine in proper position transversely of the receiving-table to operate upon the size of sheet which is being delivered and also to bring the end joggers into position laterally of the machine to reach the ends of the sheets. In addition to this transverse adjustment the jogging devices must have an independent adjustment longitudinally of the machine to bring the end joggers into proper register with the ends of the sheets and to bring the side joggers within reach, longitudinally, of the side edges of the sheets. It will be clear to those familiar with sheet-jogging devices as now commonly used that two independently-operating joggers are provided to operate upon each of the four sides of a sheet, making eight jogging devices in all.

115 is one of four brackets slidingly mounted upon one of the bars 106 and formed with an integral guide-bracket 116, which guides upon the bar 107. Each of these brackets 115 is capable of independent adjustment longitudinally of the bars 106 and 107, a set-screw 117 being provided to bind upon the rod 106 to hold the bracket in the desired adjusted position. Each of the brackets 115 carries two of the sheet-jogging devices presented at right angles to each other, one adapted to operate at the side of the sheets and the other

adapted to operate at the end of the sheets, the first of said jogging devices being arranged longitudinally of the machine, while the second is arranged transversely of the machine.

The side-acting jogging device comprises a plate or board 120, mounted upon a guide rod or bar 121, rigidly secured to and projecting horizontally from its outer face. This rod or bar 121 slides freely in a laterally-projecting socketed guide portion 122, formed integral with or rigidly secured to the bracket 115, the said socketed portion 122 being formed with a slot 123 in its upper face, through which projects a pin or lug 124, secured to the bar 121. A second pin or bar 125 projects from the outer face of the jogging-plate 120 and guides in a socketed lug 126, secured on the upper face of the bracket 115. Pivoted at 127 to a lug 128 of the jogging-plate 120 is a rod 129, which passes freely through a socketed lug 130, projecting horizontally from the guide portion 122, an expansion-spring 131 surrounding rod 129 and being confined between the lug 128 and guide portion 130 to give the jogging-plate 120 a spring tendency to move inwardly into engagement with the side face of the upper portion of the pile of sheets.

Journaled upon a horizontal bracket-arm 135 is a short vertical rock-shaft 136, carrying a rock-arm 137, which engages the pin 124 of the bar 121. 138 is a second rock-arm projecting from the short rock-shaft 136 and formed with a slotted end 139, which engages a pin or lug 140, extending up from a block 141, adjustably mounted upon a reciprocating operating rod or bar 142. The rod or bar 142 is connected, through a block 143 and strap 144, with the heel of the rock-arm 9 of the printing-press delivery mechanism, said strap 144 passing around an antifriction-roller 145 to properly direct its course. The several independent springs of the jogging devices tend to move the jogging-plates inwardly and pull the rod 142 rearwardly, causing it to follow closely the movements of the rock-arm 9.

Each of the adjustable brackets 115 is formed with an inwardly-projecting integral bracket-arm 115^a, upon which is mounted one of the jogging devices which operates upon the front or rear edge of the pile of sheets. 150 is one of the end-jogging plates, formed with the same supporting and guiding bars 121 and 125 and the same spring-actuated rod 129 as already described with reference to one of the side-acting jogging-plates. In this end-jogging device the guiding and supporting bar 121 operates in a socketed extension 122^a of the bracket, and a pin or lug 124 projects up through the slot 123 into position to be engaged by the rock-arm 151, extending from the short vertical rock-shaft 152, suitably journaled in the bracket 115^a and having a second rock-arm 153 projecting from it and connected, through a rod or link 154, with a short arm 155, formed integral with the rock-arm 138. By this means the end-jogging device 150 is operated simultaneously with and in the same manner as side-jogging device 120 from the longitudinally-reciprocating rod 142.

The above description of two of the eight independent jogging devices arranged around the pile of sheets will, it is thought, render clear the construction and operation of all of the devices, since each pair of the rectangularly-arranged joggers at each corner of the pile is constructed and is operated exactly as described. It will of course be clear that an actuating rod or bar 142, independently connected with the press-delivery mechanism, is provided at each side of the machine, each rod or bar operating the four independent joggers mounted upon its side of the machine.

In printing certain classes of work, particularly fine work or work in which a great mass of color has been deposited upon the sheets, it is sometimes necessary in order to prevent the offsetting of the impressions and the spoiling of the job to deliver the sheets from the press into shallow trays or boxes, which are usually of such depth that they will hold from two hundred to two hundred and fifty sheets each. When such trays or boxes are used to receive the delivered sheets, it is unnecessary to employ sheet-jogging devices for keeping the sheets straight, since the boxes perform this function. We can employ such sheet-receiving trays or boxes with our improved self-lowering delivery-table by simply removing the jogging devices or moving them back out of the way and throwing them out of operation. In Fig. 6 of the drawings we have illustrated a series of three of such sheet-receiving trays or boxes, in which each tray or box 150 is formed with side flanges 151 to insure the proper placing of one box upon another when they are piled upon the self-lowering table. When these trays or boxes are used, it will of course be clear that as fast as one box is filled another one is slid into place on top of the filled box in readiness to receive the succeeding series of sheets. In this adaptation of our invention it will be necessary to lower the delivery-table somewhat more rapidly than in the ordinary operation of the machine, for the reason that ample space must be provided for the boxes, which are piled one upon another upon the delivery-table.

Whether the sheets are piled directly upon the table or in a series of trays or boxes just referred to we have found it very desirable and convenient to provide for the removal of the pile of sheets as a whole from the receiving-machine. We accomplish this by the

above-described arrangement of the skeleton frame-receiving mechanism, on which is mounted the removable receiving-board. We use the ordinary printer's truck (shown at 175) to receive the pile of sheets from the delivery mechanism, the truck being wheeled into position directly beneath the receiving-board 70 and within the supporting-flanges 71 of the self-lowering skeleton frame, so that when the pile of delivered sheets is completely piled up upon the table 70 it will have been lowered upon the truck 175 and free of the supporting-flanges 71, so that it only remains to wheel out the truck 175 with the pile of sheets mounted upon it. This plan of operation is particularly convenient when the pile of sheets is to be printed first on one side and then on the other by two separate operations. In this case the pile of once-printed sheets collected upon the feed-board and taken away from the receiving mechanism by the truck 175 can be immediately transferred to the paper-feeding machine of the press which is to supply the second impression upon the sheets.

Having thus described our invention, what we claim as new therein, and desire to secure by Letters Patent, is—

1. The combination with a machine designed to operate upon sheets of paper, of a receiving-table adapted to receive sheets delivered from said machine, means for automatically lowering said table as the received sheets pile upon it, and variably-adjustable means for regulating or controlling the lowering of the table to meet the varying requirements, as set forth.

2. The combination with a machine designed to operate upon sheets of paper, and a delivery mechanism for said machine, of a vertically-movable receiving-table adapted to receive sheets delivered from said machine, means, for lowering said receiving-table, including a ratchet-wheel and an oscillatory pawl, an adjustable controller-plate mounted adjacent to said ratchet-wheel and adapted to engage a part of said pawl for determining the length of the active stroke of the pawl, and means for automatically adjusting said controller-plate to meet the varying requirements, substantially as set forth.

3. The combination with a machine designed to operate upon sheets of paper, of a feed-table from which sheets are fed to said machine, means for raising said feed-table as the sheets are fed off, an automatic governing device controlling the feed-table-raising means, a receiving-table upon which the sheets are delivered from said machine, means controlled by the feed-table-governing device for automatically lowering said receiving-table as the delivered sheets are piled upon it, and variably-adjustable means for controlling the lowering of the receiving-table, substantially as and for the purpose set forth.

4. The combination with a machine designed to operate upon sheets of paper, of a feed-table from which sheets are fed to said machine, means for raising said feed-table as the sheets are fed off, an automatic governing device controlling the feed-table-raising means, a receiving-table upon which the sheets are delivered from said machine, means for automatically lowering said receiving-table as the delivered sheets are piled upon it, said receiving-table-lowering means including a ratchet-wheel, an oscillatory operating-pawl, and a movable controller-plate mounted adjacent to said ratchet-wheel and adapted to engage a part of said pawl for determining the length of its active stroke, and means connecting the feed-table-governing device with said controlling-plate, substantially as set forth.

5. The combination with a machine designed to operate upon sheets of paper, and a delivery mechanism for said machine, of a feed-table, suitable elevating mechanism for said feed-table including an oscillating operating-arm, a governing device controlling the operation of the operating-arm according to the height of the pile of sheets upon the feed-table, a receiving-table upon which the sheets are delivered from said machine, lowering means for said receiving-table including a ratchet-wheel, an oscillatory operating-pawl, and a movable controller-plate adapted to engage a part of the pawl for determining the length of its active stroke, and means connecting the operating-arm of the feed-table with said controller-plate, substantially as set forth.

6. The combination with a machine designed to operate upon sheets of paper, of a sheet-receiving frame, a vertically-movable table supported in said frame, vertical feed-screws journaled in said frame and engaging said table, horizontal short shaft-sections journaled in the upper part of the side frames of said receiving-frame and geared to said feed-screws, a transverse shaft mounted upon said frame out of the vertical path of the table and suitably connected with said short shaft-sections for causing them to operate in unison, means for operating said short shaft-sections for lowering said table as the received sheets are piled upon it, and suitable sheet-jogging devices mounted upon the upper part of said sheet-receiving frame independently of said receiving-table, substantially as set forth.

7. The combination with a machine designed to operate upon sheets of paper, of a sheet-receiving frame, a receiving-table mounted in said frame, means for automatically lowering said table as the received

sheets pile upon it, suitable rods or bars extending transversely of said frame adjacent to its top, frames or carriages mounted upon said transverse rods or bars, means for adjusting said frames or carriages transversely of the machine, independent brackets mounted upon said frames or carriages and adjustable thereon longitudinally of the machine, and independent sheet-jogging devices mounted upon said adjustable brackets, substantially as set forth.

8. The combination with a machine designed to operate upon sheets of paper, of a receiving-table adapted to receive sheets delivered from said machine, means for automatically lowering said table as the received sheets are piled upon it, means for regulating or controlling the lowering of said table, a framework supported above and independently of the table, suitable sheet-jogging devices supported upon said framework in position to operate upon the upper portion of a constantly-increasing pile of sheets upon the lowering table, and means for operating said jogging devices, as set forth.

9. The combination with a machine designed to operate upon sheets of paper, of a feed-table from which sheets are fed to said machine, means for raising said feed-table as the sheets are fed off, an automatic governing device controlling the feed-table-raising means, a receiving-table upon which the sheets are delivered from said machine, means for automatically lowering said receiving-table as the delivered sheets are piled upon it, suitable sheet-jogging devices mounted independently of said receiving-table in position to operate upon the upper part of a pile of sheets, and means connecting the feed-table-governing device with the receiving-table-lowering means, substantially as and for the purpose set forth.

10. The combination with a machine designed to operate upon sheets of paper, of a receiving-table for the sheets delivered from said machine, a jogger-supporting frame including suitable horizontal supporting-bars, brackets mounted upon said supporting-bars, each of said brackets comprising a main bracket portion and a bracket-arm extension extending approximately at right angles to the main bracket portion, independent sheet-jogging plates or boards mounted respectively upon the main portion of the bracket and upon the angularly-extended bracket-arm, and suitable operating means connected with said independent sheet-jogging plates or boards for operating them, substantially as set forth.

11. The combination with a machine designed to operate upon sheets of paper, of a sheet-receiving table for said machine, a jogger-supporting frame including suitable horizontal supporting-bars, a series of brackets adjustably mounted upon said supporting-bars and each bracket comprising a main bracket portion and an auxiliary bracket-arm extension projecting approximately at right angles to the main bracket portion, an independent sheet-jogging plate or board movably mounted upon each of the main bracket portions and upon each of the bracket-arm extensions, suitable guide-rods projecting from said jogging plates or boards and guiding upon said bracket portions, actuating-levers engaging parts projecting from said guide-rods, means connecting the actuating-levers of each pair of jogging plates or boards mounted upon the same bracket, and operating means suitably connected with said operating-levers, substantially as set forth.

12. The combination with a machine designed to operate upon sheets of paper, of a receiving-table adapted to receive sheets delivered from said machine, a jogger-supporting frame including suitable horizontal supporting-bars, a series of brackets adjustably mounted upon said supporting-bars and each bracket comprising a main bracket portion and a bracket-arm extending approximately at right angles to the main bracket portion, independent sheet-jogging plates or boards formed with outwardly-projecting guide-rods which are slidingly mounted in suitable guides formed in the main bracket portions and extension bracket-arm portions, pins projecting from one of the guide-rods of each jogging plate or board, rock-arms engaging said pins, means connecting the rock-arms of each pair of jogging plates or boards upon the same supporting-bracket, means for operating said rock-arms for drawing the jogging plates or boards outwardly, and an independent spring actuating each jogging plate or board for tending to move it inwardly into engagement with the pile independently of the other jogging plates or boards, substantially as set forth.

13. The combination with a machine designed to operate upon sheets of paper, of a sheet-receiving table adapted to receive sheets delivered from said machine, a jogger-supporting frame including suitable horizontal supporting-bars, a series of four brackets adjustably mounted upon said supporting-bars and each bracket comprising a main bracket portion and a bracket-arm extension projecting approximately at right angles to the main bracket portion, a series of eight independent jogging plates or boards mounted upon said brackets, two being mounted upon each of said brackets with their jogging-faces extending approximately at right angles to each other, suitable guide-rods projecting outwardly from each jogging plate or board and slidingly mounted in one of the brackets, an independent spring engaging

each jogging plate or board and tending to move it inwardly into engagement with the pile, a controlling or operating rock-arm engaging a part connected with each jogging plate or bar, means connecting said controlling rock-arms in pairs, and two operating-bars each of which is operatively connected with two connected pairs of jogger-actuating rock-arms, substantially as set forth.

TALBOT C. DEXTER.
HENRY HALLSTREAM.

Witnesses:
J. GREEN,
WM. E. KNIGHT.