

T. C. DEXTER & R. E. JONES.
SHEET STRAIGHTENING MECHANISM FOR PAPER FEEDING MACHINES.

APPLICATION FILED MAY 8, 1911.

1,057,123.

Patented Mar. 25, 1913.

4 SHEETS—SHEET 1.

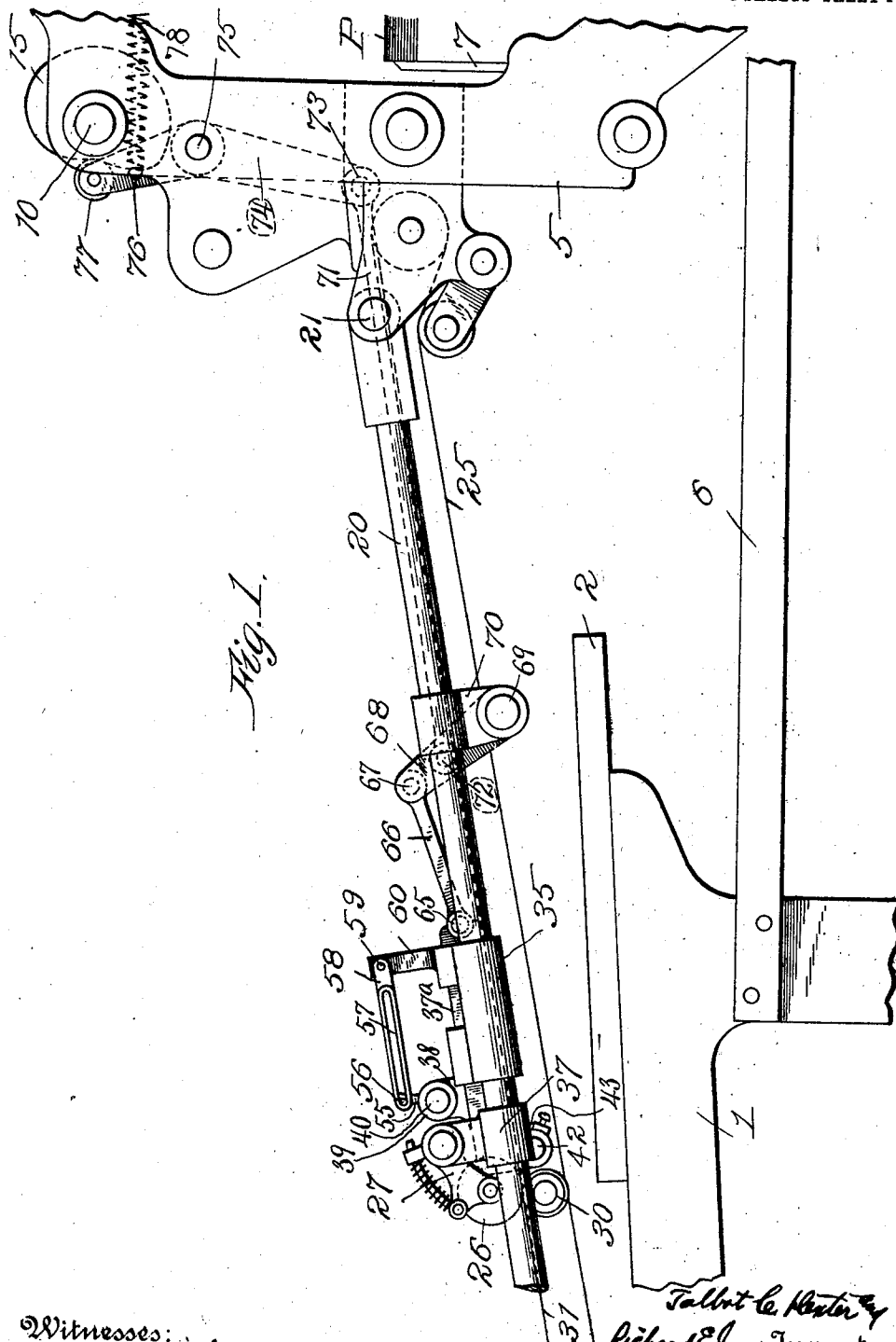


Fig. 1.

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Clara Hokenstein

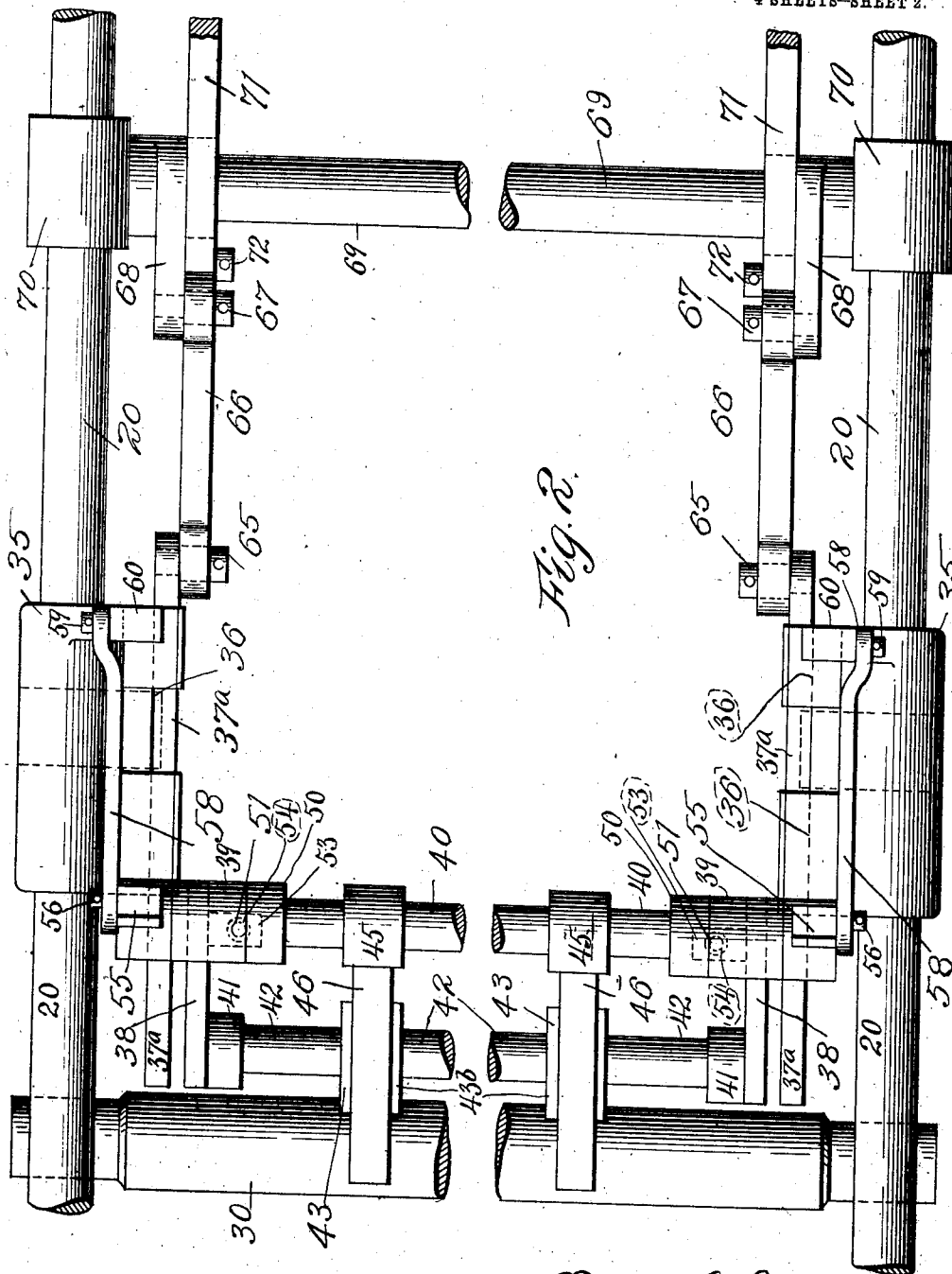
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4 SHEETS-SHEET 2.



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1,057,123.

4 SHEETS—SHEET 3.

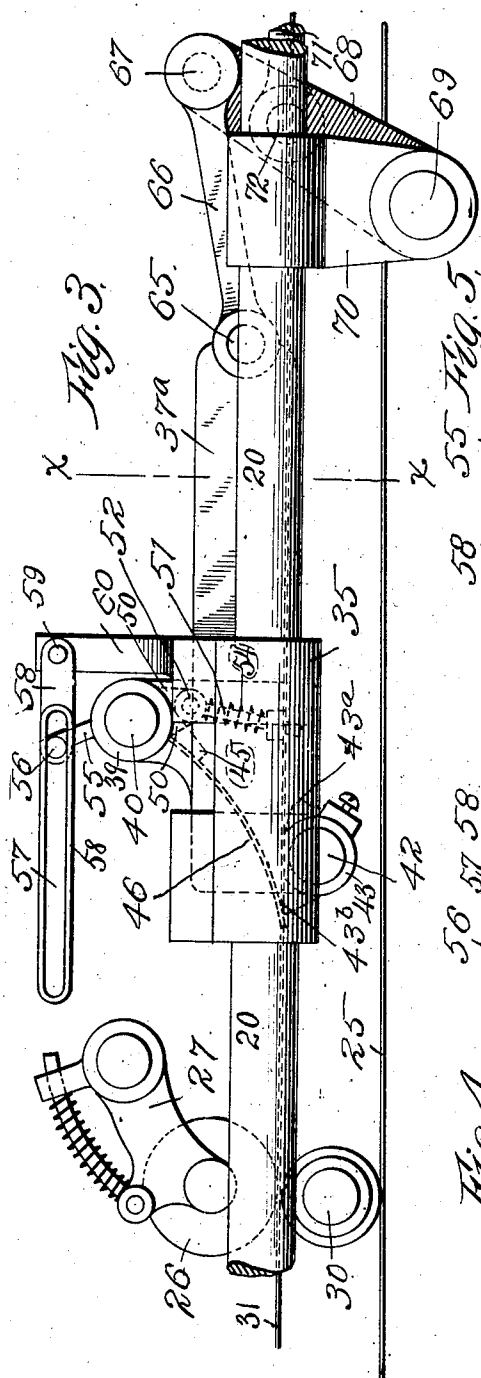


Fig. 3.

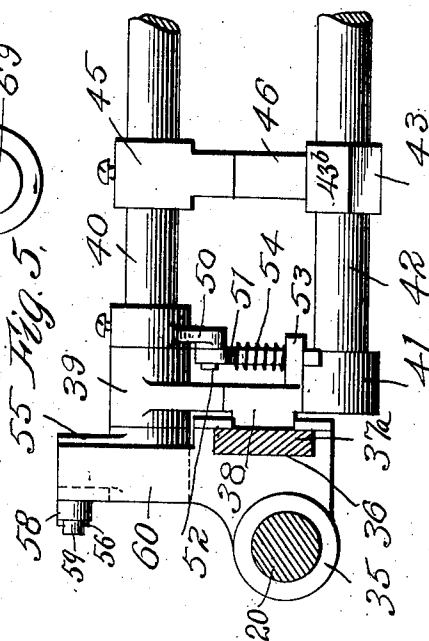


Fig. 5.

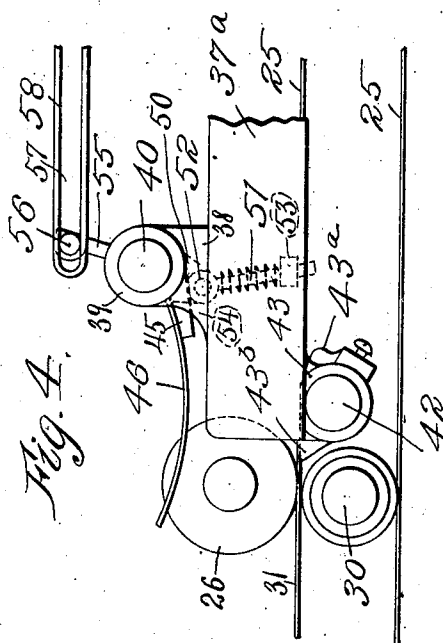


Fig. 4.

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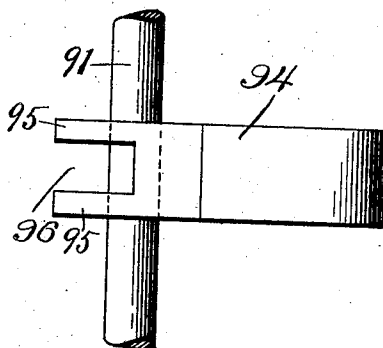
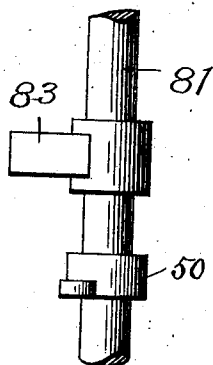
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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SHEET-STRAIGHTENING MECHANISM FOR PAPER-FEEDING MACHINES.

1,057,123.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed May 8, 1911. Serial No. 625,735.

To all whom it may concern:

Be it known that we, TALBOT C. DEXTER and RICHARD E. JONES, both citizens of the United States, and residents of Pearl River, Rockland county, in the State of New York, have invented certain new and useful Improvements in Sheet-Straightening Mechanism for Paper-Feeding Machines, of which the following is a specification.

10 The object of the present invention is to produce a simple and effective form of auxiliary sheet straightening mechanism which can be applied to a sheet conveyer between the paper feeding machine and the
15 printing press to correct inequalities in the position of successive sheets upon the conveyer without interfering with the rapid succession of sheets necessary to supply the high speed printing presses which are now
20 commonly employed.

To this end our invention comprises an auxiliary reciprocating sheet straightening frame or carriage mounted upon the conveyer frame and provided with cooperating
25 upper and lower sheet straightening members arranged respectively above and below the plane of feed of sheets, and operating and controlling devices to cause said frame or carriage to move with the sheets at a
30 slightly slower speed so that the sheets will engage said positioning members and become straightened upon the conveyer while they are moving toward the gages of the press. The operating and controlling devices are so arranged that the straightened
35 sheet will be released just prior to the limit of forward movement of the sheet straightening frame or carriage to permit the sheet to pass on in straightened position to the
40 press gages, while the straightening frame or carriage returns to its initial position to receive a succeeding sheet.

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

In said drawings: Figure 1 is a detail side elevation of a sheet conveyer having our
50 improved auxiliary sheet straightening mechanism applied thereto. Fig. 2 is a detail plan view of the same; the sheet con-

veying tapes being omitted. Fig. 3 is a detail side elevation, on a larger scale, showing the main parts of the improved mechanism. Fig. 4 is a similar detail view of parts shown in Fig. 3 illustrating a shifted position. Fig. 5 is a detail vertical transverse sectional view taken on the line $x-x$ of Fig. 3 looking forward. Fig. 6 is a view
60 similar to Fig. 3 showing a slight modification. Figs. 7 and 8 are detail views of the upper and lower sheet straightening members of the modified form shown in Fig. 6.
1 represents part of the frame of an ordinary printing press and 2 the press feed
65 board.

5 is part of the frame of an automatic paper feeding machine and 6 is one of the strap bars usually employed for rigidly
70 connecting the press frame to the feeder frame for holding them in proper relative position.

A part of the pile of sheets in the automatic feeder is represented at P and the usual pile front guides are shown at 7.
75

10 is the main cam shaft of the feeder, carrying in addition to the usual controlling cams of the feeding mechanism an auxiliary controlling cam 15 for operating the improved auxiliary sheet straightening
80 mechanism presently to be described.

The usual sheet conveyer frame is represented at 20. This frame, comprising suitable side bars and end brackets, is pivotally
85 mounted at 21, to the frame 5 of the feeding machine so as to extend over the press feed board 2 and present the delivery end of the conveyer in proper relation to the press gages (not shown) for delivering the successive sheets to the printing press. This
90 conveyer includes the usual sheet conveying tapes indicated at 25 which operate over tape rollers and are driven in a manner well understood in this art. Sheets separated
95 from the pile P are delivered from the feeder by the usual drop roller delivery mechanism (not shown) to the conveyer tapes 25 which carry them forward to the press. In the form of conveyer illustrated, there is an intermediate lower tape roller
100 journaled to brackets suitably secured to the conveyer frame and auxiliary tapes 31 passing over said roller and leading to the delivery end of the conveyer frame. Upper

friction rollers 26 journaled in spring pressed rock arms 27 pivoted to brackets 37 are arranged to hold the sheets in frictional engagement with the intermediate lower tape roller 30 to insure the successive sheets remaining under the control of the lower tape roller 30 and delivery tapes 31.

Adjustably secured to the side bars of the conveyer frame 20 are the brackets 35 formed upon their inner faces with guide channels 36 in which slide the side bars 37^a of the sheet straightening frame or carriage. Each of these side bars 37^a carries a bracket 38 one arm 39 of which projects upwardly and terminates in a sleeve bearing to receive a transverse shaft 40 while the other arm of which projects downwardly and terminates in a boss or bearing 41 in which is mounted a transverse shaft or bar 42. The bar 42 extends from side to side of the conveyer beneath the plane of feed of sheets and is supported at its opposite ends in the brackets of the straightening frame of the carriage. Intermediate of the ends of said bar 42 are adjustably mounted the sheet engaging and supporting shoes 43 which constitute the lower sheet positioning members of the improved sheet straightening mechanism. Each of these shoes is preferably shaped as shown in Figs. 3 and 4 of the drawings, in which it will be observed that the upper surface of each shoe is curved slightly from a point beneath the plane of feed to a point approximately in the plane of feed, thereby forming a rounded heel 43^a to insure the advancing front edge of the sheet passing over the shoe, and a nose 43^b with which the upper sheet positioning members cooperate in the manner which will now be explained. By adjusting these members 43 upon their supporting bar 42, they can be properly placed to produce the best results.

40 is a rock shaft journaled in the bracket bearing 39 of the reciprocating straightening frame or carriage. This rock shaft 40 carries between its ends adjustably mounted arms 45 to which are secured curved sheet engaging plates or fingers 46. A plate or finger 46 is thus arranged in the same vertical plane with each of the shoes 43 and thereby constitutes the upper sheet positioning members.

A toggle arm 50 is adjustably secured to the rock shaft 40 adjacent to one of the bearings 39, and a second toggle link 51 is pivoted at 52 to the toggle arm 50 and extends therefrom through an opening in a bracket plate 53 projecting from bracket 38. A small expansion spring 54 surrounds the toggle link 51 and is confined between the bracket plate 53 and the head of the toggle link 51. This spring actuated toggle arm 50, and toggle link 51 constitute an automatic toggle latch for holding the rock shaft

40 and attached parts in either of its two shifted positions. The rock shaft 40 also carries at one end a rock arm 55 having a laterally projecting pin or lug 56 which is presented in the slot 57 of the longitudinally slotted link 58 pivoted at 59 to the post 60 projecting upwardly from the bracket 35. If preferred the shaft 40 may have rock arms 55 engaging the slotted links 58 at both sides of the conveyer frame as shown in Fig. 2, although the device at one side will accomplish the purpose in most instances. In the reciprocation of the sheet straightening frame or carriage, the pin or lug 56 will engage the opposite ends of slot 57 of link 58 to rock shaft 40 first one way and then the other at the opposite points of movement of the carriage.

Each side bar 37^a of the reciprocating frame or carriage has pivoted to it at 65 a link 66 which is pivoted at 67 to the upper end of a rock arm 68 journaled at 69 upon a depending bracket arm 70 secured to the conveyer frame. A rod 71 is pivoted at 72 to each rock arm 68 and extends rearwardly therefrom and is pivoted at 73 to the lower end of a rock arm or lever 74 depending from rock shaft 75 journaled in the feeder frame. The rock shaft 75 has an upwardly extending rock arm 76 carrying an antifriction roller 77 which runs in peripheral contact with the controlling cam 15 above referred to, some suitable spring device such as shown at 78 being arranged to hold the parts in operative relation to the cam.

It will be understood that in the operation of our improved sheet straightening mechanism, sheets are successively fed from the pile of the automatic feeder to the tapes of the conveyer frame which carry the successive sheets to the press gages. As the leading edge of each sheet arrives between the upper and lower positioning members 43 and 46 (a pair of which is arranged adjacent to each side of the conveyer frame) the parts are in the position shown in Fig. 3 of the drawings, the controlling cam 15 being at the moment moving the sheet straightening frame or carriage with its positioning members in the same direction as the sheet is traveling, but at a slightly slower speed. Since the conveyer tapes attempt to move the sheet slightly faster than the upper and lower sheet positioning members are moving, it will be understood that the leading edge of the sheet will engage in the crotches formed by the intersection of upper members 46 with lower members 43 and that in the event that the sheet is not advancing squarely with the conveyer, the side of the sheet which first engages the positioning members of the straightening mechanism, will be held back while the other side of the sheet is forced forwardly by the action of

the tapes until the sheet is placed squarely upon the tapes. The retarding action of the sheet positioning members is very slight so as not to interfere materially with the necessarily rapid progress of the sheets through the conveyer. As the sheet straightening mechanism reaches the limit of its forward motion with the sheet under control, the pin or stud 56 engages the end of the slot 57 of link 58 and rocks the shaft 40 to raise the upper members 46 away from the lower members 43 to permit the sheet to pass on through the conveyer under friction rollers 26 to the tapes 31 which carry the sheet to the gages. As the sheet is released from the straightening mechanism, the reciprocating frame or carriage is drawn back by the action of its cam and when it reaches the limit of its backward movement, the stud or pin 56 engages the rear end of slot 57 of the link 58 to again rock shaft 40 for placing upper members 46 in sheet arresting position. The sheet straightening mechanism then moves forward again to repeat the operation just described.

In Figs. 6, 7 and 8 of the drawings, we have shown a slight modification in which the reciprocating carriage, constructed substantially as above described, is formed with downwardly presented lugs 80 supporting a rock shaft 81 beneath the conveyer tapes. This rock shaft 81 carries two rock arms 82 to which are attached gage plates or fingers 83 adapted to be moved across the path of sheets. The rock shaft 81 also has a rock arm 84 having a lateral pin or lug 85 operating in slot 86 of a link 87 pivoted at 88 to a depending post 89 secured to side bracket 35. The reciprocating carriage also has forwardly presented bracket lugs 90 in which is carried the bar 91 upon which are adjustably mounted bracket yokes 92 having mounted upon them the vertically adjustable plates 93 carrying curved arms 94 supporting curved sheet engaging tongues 95 formed with bifurcated ends 96. These curved sheet engaging tongues 95 are adjusted to present them approximately in the plane of feed with their rear portions curving away from the plane of feed. The parts are so arranged relatively that gage fingers 83 will rest in the bifurcated ends 96 of tongues 95 when the parts are in position to intersect the sheet. The rock shaft 81 is provided with the spring actuated toggle latching device 50, 51, 52, 53, substantially as above described, excepting that the parts are reversed in position to correspond with the changed arrangement. This toggle latching device serves to hold the rock shaft 81 in either of its shifted positions after it is actuated by said slotted link 86 and rock arm 84. The operation of this modified form of the mechanism is substantially the same as the preferred form, excepting that

in the modified form the member which is moved into and out of the path of the sheets is the lower member; whereas in the preferred form, the upper member is the movable one.

The improved sheet straightening mechanism is effective for straightening sheets upon a conveyer for feeding sheets to a rapidly operating press, since the sheets are readily straightened upon the conveyer while they are in transit from the feeding machine to the press, there being no material interference with the rapidity of movement and succession of sheets during the operation.

What we claim is:

1. The combination with sheet conveying tapes, a carriage reciprocating parallel with said tapes, means for reciprocating said carriage at a slower rate than said tapes, sheet confining members upon said carriage upon one side of the plane of feed of sheets, cooperating sheet engaging fingers movable into and out of the path of sheets, and means for automatically actuating said movable sheet engaging members.

2. The combination with a sheet conveyer, having means for moving sheets, of a frame or carriage reciprocating parallel with the plane of feed of sheets, curved sheet confining members mounted upon said carriage upon one side of the plane of feed of sheets, a rock shaft journaled upon said carriage upon the opposite side of the plane of feed of sheets, sheet engaging fingers mounted upon said rock shaft and adapted to move into and out of engagement with said sheet confining members for intercepting sheets upon the sheet moving means, a rock arm projecting from said rock shaft, a slotted link mounted upon a stationary support and engaging said rock arm, a spring actuated toggle latch interposed between said carriage and said rock shaft for yieldingly holding the rock shaft in either of its shifted positions, and mechanism for operating said carriage.

3. The combination with a conveyer frame, an auxiliary reciprocating sheet straightening frame mounted upon the conveyer frame and provided with cooperating upper and lower sheet straightening members arranged respectively above and below the plane of feed of the sheets, operating and controlling devices adapted to cause said straightening frame to move with the sheets at a slightly slower speed than the feed so that the sheets will engage said straightening members and become straightened while they are moving forward; the operating and controlling devices being so arranged that the straightened sheet will be released just prior to the limit of forward movement of the sheet straightening frame so as to permit the sheet to pass on in

straightened position while the straightening frame returns to its initial position to receive a succeeding sheet.

4. The combination, with a conveyer
5 frame having side bars; of the guide brackets, one or both having an arm and fixed to the side bars and provided with guide channels, side bars sliding in the guide channels and each carrying a bracket formed with an
10 upwardly projecting arm terminating in a sleeve, and a downwardly projecting arm terminating in a bearing, an upper rock shaft mounted in the upper arms, a lower
15 shaft mounted in the lower arms, sheet engaging and supporting shoes secured to the

lower shaft, arms fixed to the rock shaft and having curved sheet engaging fingers, located over the shoes, a spring toggle between the rock shaft and the bracket carried by the side bars, a link having a slot and pivoted 20 to the arm of the guide bracket, a rock arm on the rock shaft having a laterally projecting pin traveling in the slot of the link, and means for reciprocating the side bars in the guide channels.

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