T. C. DEXTER & V. GARNER.

SHEET REGISTERING MECHANISM FOR PAPER FEEDING MACHINES.

APPLICATION FILED JAN. 4, 1911.

1,040,168.

Patented Oct. 1, 1912.

5 SHEETS—SHEET 1.

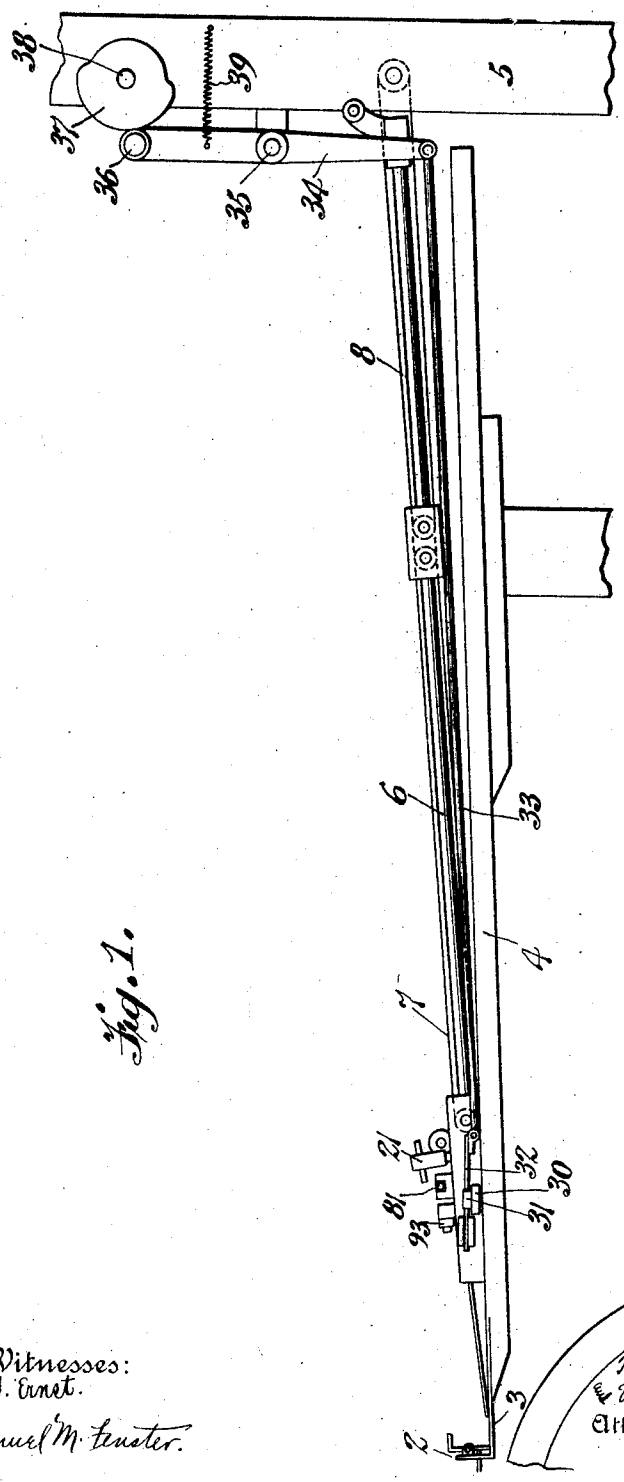

Fig. 1.

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Emanuel M. Fenster.

Talbot C. Dexter Inventors
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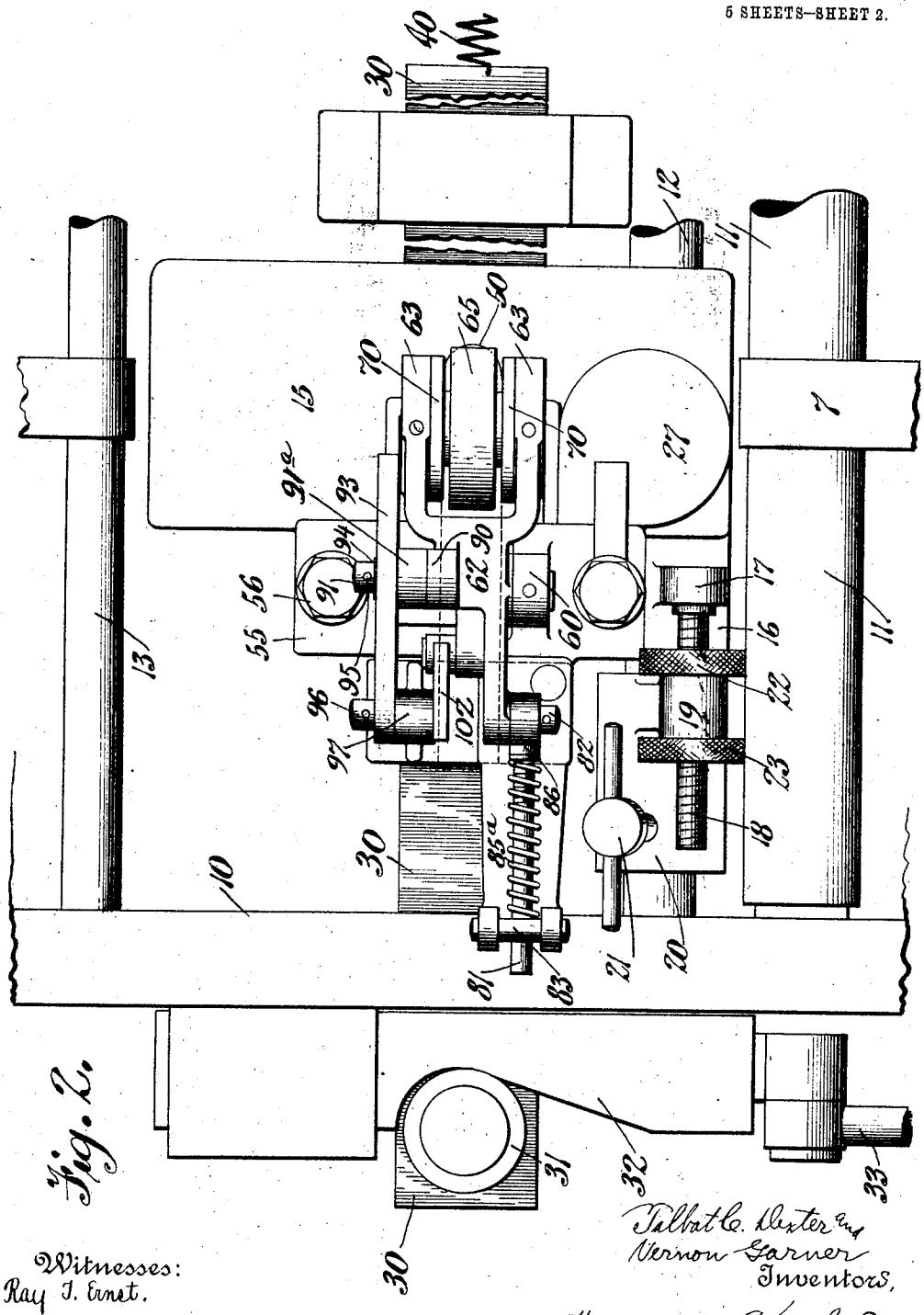

Fig. 2.

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Fig. 3.

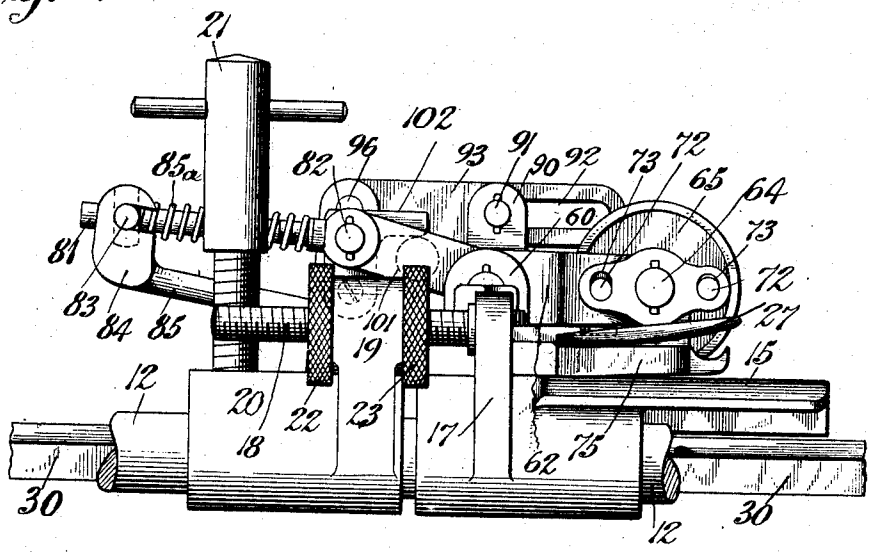
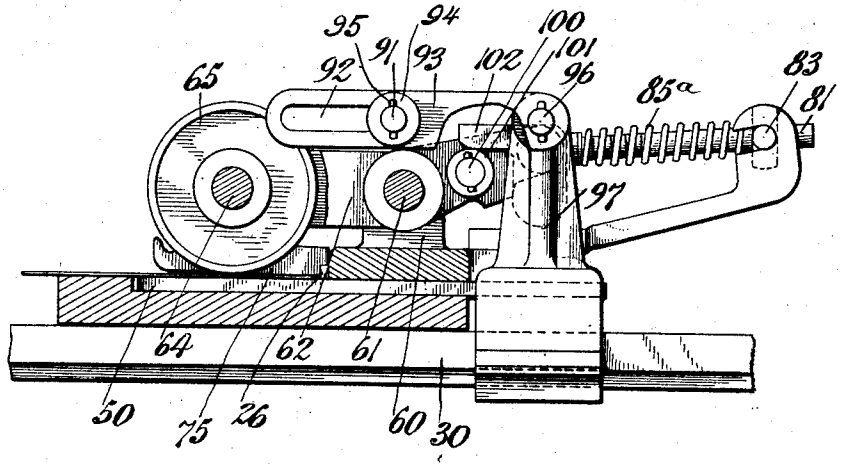


Fig. 4.



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5 SHEETS—SHEET 4.

Fig. 5

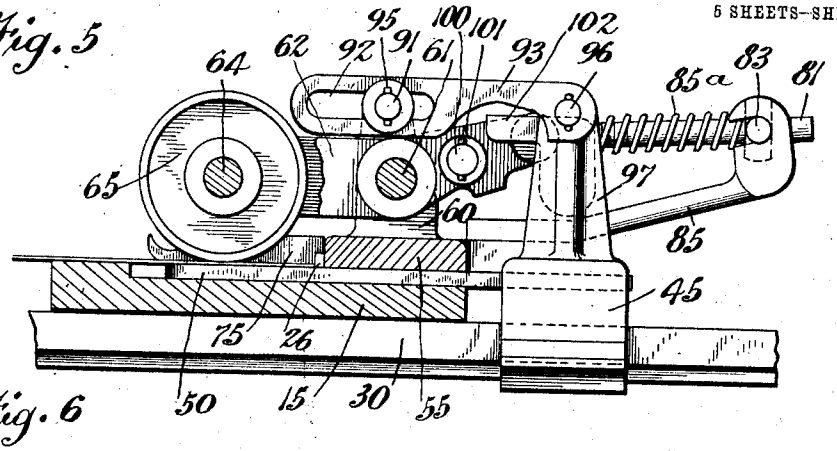


Fig. 6

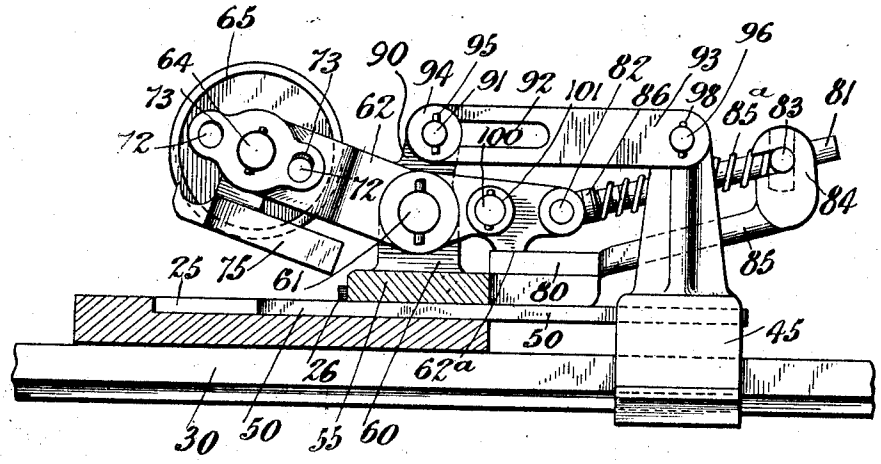
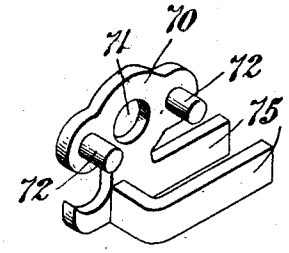


Fig. 7



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5 SHEETS—SHEET 5.

Fig. 8

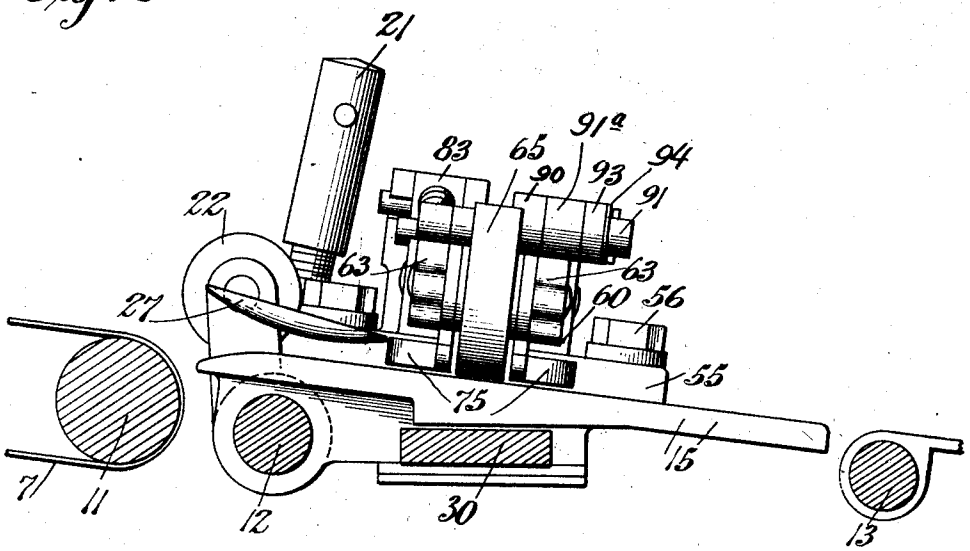


Fig. 9.

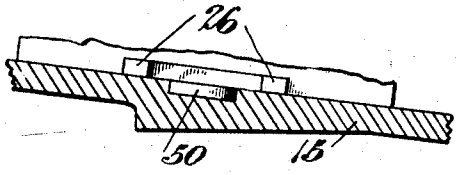
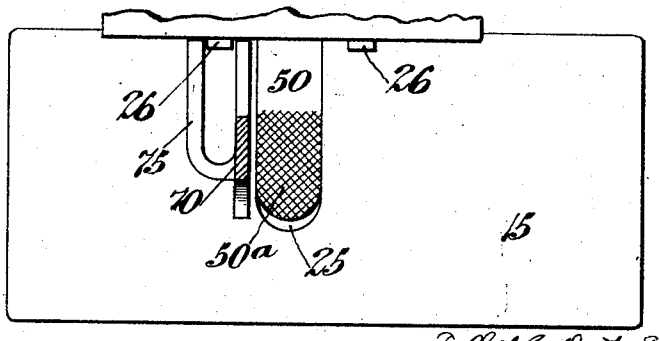


Fig. 10.



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UNITED STATES PATENT OFFICE.

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SHEET-REGISTERING MECHANISM FOR PAPER-FEEDING MACHINES.

1,040,168. Specification of Letters Patent. Patented Oct. 1, 1912.

Application filed January 4, 1911. Serial No. 600,768.

To all whom it may concern:

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

The present invention relates to improvements in the type of sheet registering mechanism employed for registering successive sheets of paper which are passed from an automatic paper feeding machine by a sheet conveyer to a printing press or other machine designed to operate upon the sheets. There are two well known types of mechanisms heretofore employed for this purpose. In the oldest and best known form of side registering mechanism used upon sheet conveyers, a two-jawed gripper device provided with a sheet registering face is arranged upon the edge of the conveyer frame upon suitable supports so that it can be reciprocated inwardly to grasp a sheet at the limit of its inward movement and draw it outwardly and release it in registered position at the limit of its outward movement. In this type of mechanism the sheet being acted upon is necessarily buckled upon the inward movement of the device by reason of the engagement of the registering face with the registry edge of the sheet. This buckling of the sheet is objectionable particularly upon a rapidly operating machine in which a very short time is allowed for registering sheets. The other type of side registering mechanism which has been largely used, comprises a stationary registering gage and coöperating positively driven registering rollers arranged above and below the plane of feed of sheets and provided with mechanism for intermittently moving one of the rollers into and out of engagement with the other. Aside from the complicated nature of this type of side registering mechanism experience has shown that there is a tendency to curl or bend the registry edge of the sheet between the gage and the bight of the registering rollers and the mechanism has proven of too great a depth for convenient application to all forms of sheet conveying frames.

The present invention has for its object to produce a simplified and improved form of side registering mechanism, and to this end the invention comprises a stationary side gage and a transversely reciprocating registering blade or tongue in combination with a friction device coöperating with the blade or tongue for holding a sheet in frictional engagement therewith, and means for holding said frictional device against motion of translation, so that the registering movement of the sheet is induced solely by the movement of the registering blade or tongue.

In the preferred embodiment of our invention, we employ the usual sheet registering and supporting plate adjustably mounted upon the conveyer frame at one side of the plane of movement of the sheets and provide said plate with suitable vertical registering shoulders and with a recess or slot to receive the transversely reciprocating registering blade or tongue. The registering blade or tongue is mounted upon a transverse bar supported beneath the sheet supporting and registering plate and has an intermittent reciprocating motion imparted to it by suitable operating mechanism. The friction device which coöperates with the registering blade or tongue is in the form of a friction roller freely journaled in the inner end of a rocking lever which is pivoted upon a suitable bracket extending up from the sheet supporting and registering plate. A spring device engages the roller supporting lever for yieldingly holding it in either position, that is with the roller lowered in engagement with the registering blade or tongue or with the roller lifted away from the blade or tongue. A lost motion connection is provided between the reciprocatory bar and a rock arm upon the said lever for raising and lowering said friction roller upon the outward and inward strokes of said reciprocatory bar. The roller supporting lever is preferably provided with sheet confining guide plates or fingers which are loosely suspended from the lever adjacent to the friction roller. These sheet confining guide fingers are preferably arranged to overlap or intersect the vertical gage faces so as to insure against the bending or buckling of the edge of the sheet as it is drawn into registered position against the gages. In this way the sheet is confined

below by the supporting and registering plate and above by the guide fingers.

In addition to the above named features of our improved side registering mechanism, we have found it desirable in some cases, particularly when registering sheets upon a very rapidly operated machine, to provide means for delaying the engagement of the sheet by said device until the outward or registering movement of the device is started. This means comprises, as shown in the specific embodiment of our invention hereinafter set forth, an anti-friction roller journaled upon the wheel supporting lever at one side of its pivot, and an overhanging cam finger supported upon a post extending up from the reciprocatory bar in position to engage said anti-friction roller at the limit of the inward motion of said bar and said registering blade or tongue so as to arrest the movement of the roller just before the friction wheel engages the sheet against the blade or tongue and supports the wheel in this position for an instant while the reciprocatory bar starts to move outwardly. During the slight interval before the sheet is engaged between the friction wheel and registering blade or tongue, the sheet is free to settle at the drop guides of the press. After the first slight outward movement of the reciprocatory bar the cam finger is drawn out of contact with the anti-friction roller upon the wheel supporting lever to allow the friction wheel to press the edge of the sheet in frictional contact with the registering blade or tongue and as the blade or tongue moves outwardly with the reciprocatory bar the sheet is drawn laterally until its edge engages the vertical side registering lugs. In the registering operation the friction wheel serves only to press the sheet into frictional engagement with the registering blade or tongue since it rolls freely upon its journal as the blade or tongue is drawn beneath it and is held against motion of translation by its supporting lever.

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 more particularly in the annexed claims.

In said drawings Figure 1 is a diagrammatic side elevation of a sheet conveyer illustrating our invention applied thereto. Fig. 2 is a plan view of one of our improved side registering mechanisms. Fig. 3 is a side elevation of the same. Figs. 4, 5 and 6 are vertical sectional elevations taken from the opposite side of the mechanism shown in Fig. 3. These three figures illustrate successive positions of the mechanism in the operation of registering a sheet. Fig. 7 is a detail perspective view of one of the sheet confining guide fingers. Fig. 8 is an inside end elevation of the registering mechanism taken from a vertical longitudinal section of the sheet conveyer. Fig. 9 is a detail vertical sectional view of the sheet supporting and registering plate. Fig. 10 is a detail horizontal sectional view showing particularly the supporting and registering plate, registering blade or tongue, a side gage, and one of the sheet confining guide fingers.

Referring first to Fig. 1 of the drawings, 1 indicates part of the impression cylinder of a printing press, 2 the press gages, 3 the under guides and 4 the feed board.

5 is part of the frame of an automatic paper feeding machine of any suitable construction.

6 indicates a conveyer frame suitably mounted upon and extending from the feeder frame 5 and resting at its lower end upon the press feed board 4. This conveyer 6 may be provided with any suitable conveyer tapes arranged in the manner well understood in this art. The frame is illustrated diagrammatically provided with main auxiliary tapes 7 and 8 which are designed to take the successive sheets from the automatic feeder and convey them to the press gages 2.

At the lower end of the conveyer frame adjacent to the press the usual side brackets 10 rest upon the feed board 4 and have mounted in and extending from them an idler tape roller 11 and the transverse stay rods or bars 12 and 13 upon which the side registering mechanism is usually adjustably mounted.

15 is the sheet supporting and registering plate formed integral with or otherwise rigidly secured to sleeve 16 which is adjustably mounted upon the stay bar 12. The plate 15 is supported in the plane of feed of sheets at one side of the path thereof. A lug 17 projects up from the sleeve 16 and has rigidly secured in its upper end a laterally projecting threaded bolt 18 which passes freely through an opening in a guide lug 19 formed integral with and projecting up from a sleeve 20 embracing the bar 12 and adjustably secured thereon by a set screw 21. Threaded upon the screw bolt 18 upon opposite sides of the bearing lug 19 are the milled nuts 22 and 23 by the adjustment of which the sheet supporting and registering plate 15 can be moved inwardly or outwardly in the plane of feed of sheets to present the side gage (hereinafter referred to) in the proper vertical plane to impart the desired registry to the sheets. This plate 15 is formed with a shallow groove or recess 25 in its upper face extending transversely with relation to the conveyer frame. Upon opposite sides of the recess 25 are mounted lugs 26 formed with vertical inner faces constituting the side registering gage against which the successive sheets are registered.

27 is a curved guide flange presented

above the receiving end of the plate 15 to properly lead the edge of the sheet over said plate in position to be taken by the registering mechanism hereinafter explained.

30 is a transversely extending reciprocatory bar suitably mounted in the conveyer frame and passing beneath the supporting and registering plate 15 through a suitable guide channel formed in the metal beneath said plate. This bar 30 carries at its upper end an anti-friction roller 31 which is engaged by a cam bar 32 mounted in suitable bearings upon the bracket frame 10 and connected by rod 33 with the lower end of a lever 34 pivoted at 35 upon the feeder frame 5 and carrying at its upper end an anti-friction roller 36 running in peripheral contact with a cam 37 upon shaft 38 of the feeder. A spring 39 holds the lever 34 and connected parts in coöperative relation to the cam 37. Any suitable device such as a spring indicated at 49 may be employed for moving the reciprocatory bar 30 inwardly under the control of the reciprocating cam bar 32 just referred to.

A yoke 45 is adjustably and rigidly mounted upon the bar 30. The sheet registering blade or tongue 50 is secured at its rear end to the yoke 45 and projects therefrom into the shallow groove or recess 25 of the sheet supporting and registering plate 15. The upper surface of the blade or tongue 50 is flush with the surface of the plate 15. This upper surface of the blade or tongue 50 may be roughened as shown at 50^a in Fig. 10 of the drawings or it may be left smooth. The character of the surface of this blade or tongue 50 will depend upon the requirements for the particular grade of paper being operated upon, it having been found from practice, that with some grades of paper the blade or tongue will operate with perfect satisfaction with a smooth sheet engaging face, whereas with other grades of paper a firmer grip is desirable and this can be obtained by roughening the surface.

55 is a bracket plate secured to the supporting and registering plate 15 outside of the registering gages 26 and bridging the slot or recess 25. This bracket 55 is secured in place by set screws or bolts 56 one of which also supports in place the curved sheet deflecting plate 27 above referred to. The bracket plate 55 is formed with a pair of upwardly presented ears or lugs 60, in which is mounted a short transverse shaft 61 upon which is centrally journaled a lever 62 formed with a yoke-shaped inner end 63 supporting a short transverse shaft 64 upon which is freely journaled a friction wheel 65. This friction wheel 65 is supported above and in the same vertical transverse plane as the registering blade or tongue 50 above referred to.

Loosely mounted upon the shaft 64 at each side of the friction wheel 65 is a plate 70 formed with a bearing opening 71 for the passage of the shaft 64 and with laterally projecting pins or lugs 72 which pass freely through the vertically elongated slots 73 formed through the arms of the lever yoke 63. These plates 70 whoch are loosely hung upon the yoke end of the lever as described have formed integral with them the sheet confining guide fingers 75 which are presented parallel with and upon opposite sides of the periphery of the friction wheel 65. The mounting of these sheet confining fingers 75 is such that they will be raised and lowered with the friction wheel but will rest against the sheet when in lowered position only by their own gravity since they have a loose connection with the wheel supporting lever 62 and are not forced down into engagement with the sheet as is the friction wheel 65. The two fingers on each side of the wheel 65 have their outer free ends presented upon opposite sides of one of the vertical side registering gage lugs 26 above referred to, so that the sheet will be accurately confined against upward displacement by the guide fingers 75 and against downward displacement by the supporting plate 15 and will be arrested in registered position by the engagement of the registering edge with the lugs 26.

The movement of the lever 62 upon its pivot shaft 61 is limited in one direction by the engagement of the friction wheel 65 with the blade or tongue 50 and in the other position when the wheel is raised away from the blade or tongue by the engagement of the lug 62^a with the bracket plate 80. An eye bolt 81 is pivoted upon a pin 82 projecting laterally from the rear end of lever 62 and extends therefrom through a swivel block 83 pivoted in the hook bearings 84 of a bracket arm 85 extending from the bracket 80 secured to an outwardly projecting lug of the bracket plate 55. An expansion spring 85^a is confined upon the bolt 81 between the swivel bearing block 83 and an adjustable nut 86 threaded upon the eye bolt 81. By adjusting the nut 86 the tension of spring 85^a can be adjusted. This spring device engaging the outer end of lever 62 will hold the lever in either of its two positions, that is with the friction wheel down in engagement with the blade or tongue 50, as shown in Figs. 4 and 5 or with the friction wheel raised above the blade or tongue as shown in Fig. 6.

90 is a rock arm formed integral with and projecting up from the lever 62 above its pivot support. This rock arm 90 is provided with the laterally projecting pin 91 which engages a longitudinal slot 92 formed in a link 93. A washer 94 and cotter pin 95 confine the slotted end of link 93 upon the

pin 91, and a spacing sleeve 91ª upon pin 91 prevents the inward displacement of link 93 upon pin 91. The outer end of the link 93 is pivotally mounted upon pin 96 projecting laterally from a post or standard 97 formed integral with the yoke 45 above referred to. A cotter pin 98 confines the link 93 upon the pin 96. With this lost motion link connection between the post 97 and rock arm 90 it will be observed that when the reciprocatory bar 30 moves to its outer position, the inner end of the slot 92 in link 93, will engage pin 91 and rock lever 62 to raise wheel 65 into the position shown in Fig. 6 of the drawings. When the bar 30 reaches the limit of its inward motion the outer end of the slot 92 will engage pin 91 for rocking the lever 62 in the other direction for lowering the wheel 65 into the position shown in Fig. 4.

The outer arm of lever 62 is provided adjacent to the pivot support of said lever with the laterally projecting lug 100 upon which is freely journaled an anti-friction roll 101 which is adapted to be engaged by an overhanging cam finger 102 which is rigidly secured to the post or standard 97. The finger 102 engages roll 101 at the limit of the inward movement of the bar 30 when the friction wheel 65 is lowered so as to prevent the friction wheel from clamping a sheet against the registering blade or tongue until the sheet has had time to come to a state of rest at the press gages. As soon as the bar 30 starts its return or outward movement the finger 102 is drawn away from roll 101 to permit friction wheel 65 to press the edge of the sheet firmly against the registering blade or tongue so that the sheet will move with the blade or tongue until it contacts with the side registering gages.

In the operation of a machine equipped with our improved sheet registering mechanism it will be understood that the successive sheets from the automatic feeding machine are passed by the conveyer into engagement with the press gages. The side registering mechanism is so adjusted that the leading edge of the sheet at the registry side will pass over the plate 15 and under guide plate 27, fingers 75 and friction wheel 65. As the leading edge of the sheet approaches the press gages, the bar 30 carrying the blade or tongue 50 moves inwardly and just as the sheet reaches the press gages, the inner end of slot 92 engages the pin upon rock arm 90 and rocks the lever 62 to cause the parts to move into the position shown in Fig. 4, the full movement of lever 62 being prevented by the engagement of finger 102 with roll 101. As the sheet comes to a state of rest at the press gages, the bar 30 and connected parts start to move outwardly, withdrawing the finger 102 from engagement with roll 101 and allowing friction wheel 65 to press the edge of the sheet into frictional engagement with the blade or tongue 50 so that the sheet will move with the blade or tongue and will be pulled laterally until its edge contacts with the gage lugs 26. As the sheet engages the lugs 26 its edge is held against curling upwardly or downwardly by the supporting plate 15 and confining fingers 75. Immediately after the registry of the sheet the inner end of slot 92 of link 93 engages the pin upon rock arm 90 and rocks the lever 62 into the position shown in Fig. 6 of the drawings. The sheet is then taken by the cylinder grippers in the usual manner and will be entirely freed from the side registering mechanism so that it can be pulled off of the conveyer frame and feed board without interference.

The distinguishing feature of the present invention is its simplicity. The registering blade or tongue has coöperating with it a friction device which is held against motion of translation and serves only to create a sufficient friction between the sheet and the blade or tongue. The registering blade or tongue is not a gripper in the ordinary sense for the reason that the coöperating friction device does not move bodily with the blade or tongue.

The device is more accurate in operation than either the ordinary reciprocating gripper registering device or the double roll registering device and avoids the objections above pointed out incident to both of said types of registering mechanism.

What we claim is:

1. In a mechanism of the character described, the combination of a sheet conveyer, a bracket fixed with relation to said conveyer, and a sheet registering gage mounted upon said bracket, with a sheet registering blade supported beneath the plane of feed of the conveyer and movable back and forth transversely of the line of feed, a rocking lever pivoted in said fixed bracket, a friction wheel journaled on said lever above said registering blade, and a movable stop finger adapted to periodically move into and out of engagement with said lever for limiting the initial movement of the wheel toward the registering blade and timing its engagement with said blade.

2. In a mechanism of the character described, the combination of a sheet conveyer, a bracket fixed with relation to said conveyer, and a sheet registering gage mounted upon said bracket, with a sheet registering blade supported beneath the plane of feed of the conveyer, a reciprocating bar supporting said blade, and movable back and forth transversely of the line of feed, a rocking lever journaled in said fixed bracket, a friction wheel journaled in said rocking arm and supported thereby above said registering blade, and a finger carried by said re-

ciprocating bar adapted to engage a part upon said lever to limit the movement of the wheel toward said blade.

3. In a mechanism of the character described, the combination of a sheet conveyer, a bracket fixed with relation to said conveyer, a registering gage upon said bracket, a reciprocatory bar mounted adjacent to said bracket and extending transversely of the conveyer, a sheet registering blade carried by said bar and supported beneath the plane of feed of sheets, a lever journaled in said bracket, an arm upon said lever, a friction wheel journaled in said lever and supported thereby above said registering blade, an arm projecting from said reciprocatory bar, and a link pivotally mounted upon one of said arms and having pin and slot connection with said other arm.

4. In a mechanism of the character described, the combination of a sheet conveyer, a bracket fixed with relation to said conveyer, a registering gage upon said bracket, a reciprocatory bar mounted adjacent to said bracket and extending transversely of the conveyer, a sheet registering blade carried by said bar and supported beneath the plane of feed of sheets, a lever journaled in said bracket, a friction wheel journaled in said lever and supported thereby above said registering plate, a post projecting from said reciprocatory bar and a link pivotally mounted upon said post and having pin and slot connection with said rock arm.

5. In a mechanism of the character described, the combination of a sheet conveyer, a bracket fixed with relation to said conveyer, a registering gage upon said bracket, a reciprocatory bar mounted adjacent to said bracket and extending transversely of the conveyer, a sheet registering blade carried by said bar and supported beneath the plane of feed of sheets, a lever journaled in said bracket, a friction wheel journaled in said lever and supported thereby above said registering blade, a post projecting up from said reciprocatory bar, means operated from said bar for rocking said lever, a finger carried by said bar, and a projection upon said lever adapted to be periodically engaged by said finger for limiting the movement of the lever in one direction.

6. In a mechanism of the character described, the combination of a sheet conveyer, a bracket fixed with relation to said conveyer, a registering gage upon said bracket, a reciprocatory bar mounted adjacent to said bracket and extending transversely of the conveyer, a sheet registering blade carried by said bar and supported beneath the plane of feed of sheets, a lever journaled in said bracket, a friction wheel journaled in said lever and supported thereby above said registering blade, a post projecting up from said reciprocatory bar, means connecting said post with said lever for rocking the lever, an anti-friction roller journaled upon said lever, and a finger projecting from said post in position to engage said roller for limiting of movement of the lever in one direction.

7. In a mechanism of the character described, the combination of a sheet conveyer, a sheet supporting and registering plate mounted at one side of said conveyer, a registering gage upon said plate, a reciprocatory bar mounted beneath said plate and extending transversely of said conveyer, means for reciprocating said bar, a sheet engaging blade mounted upon said bar and supported flush with said supporting and registering plate, a bracket projecting up from said plate, a rocking lever pivotally mounted in said bracket, a friction wheel journaled in said lever and supported thereby above said sheet engaging blade, a spring device engaging said lever for yieldingly retaining it in either of its positions, a rock arm projecting from said lever adjacent to its pivot, a stud mounted in said rock arm, a post projecting up from said bar, a stud upon said post, and a longitudinally slotted link pivotally mounted upon one of said studs and engaged in its slot by the other of said studs.

8. In a mechanism of the character described, the combination of a sheet conveyer, a sheet supporting and registering plate mounted at one side of said conveyer, a registering gage upon said plate, a reciprocatory bar mounted beneath said plate and extending transversely of said conveyer, means for reciprocating said bar, a sheet engaging blade mounted upon said bar, a bracket projecting up from said plate, a rocking lever pivotally mounted in said bracket, a friction wheel journaled in said lever and supported thereby above said sheet engaging blade, means for rocking said lever, a post projecting up from said bar, an anti-friction roller journaled upon said lever in rear of its pivot, and a cam finger projecting from said post into the path of said anti-friction roller to limit the movement of the lever in one direction.

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