

SHEET FEEDING MECHANISM FOR PRINTING PRESSES.

1,406,978.

4 SHEETS--SHEET 1.



Witnesses:-

J. George Barry
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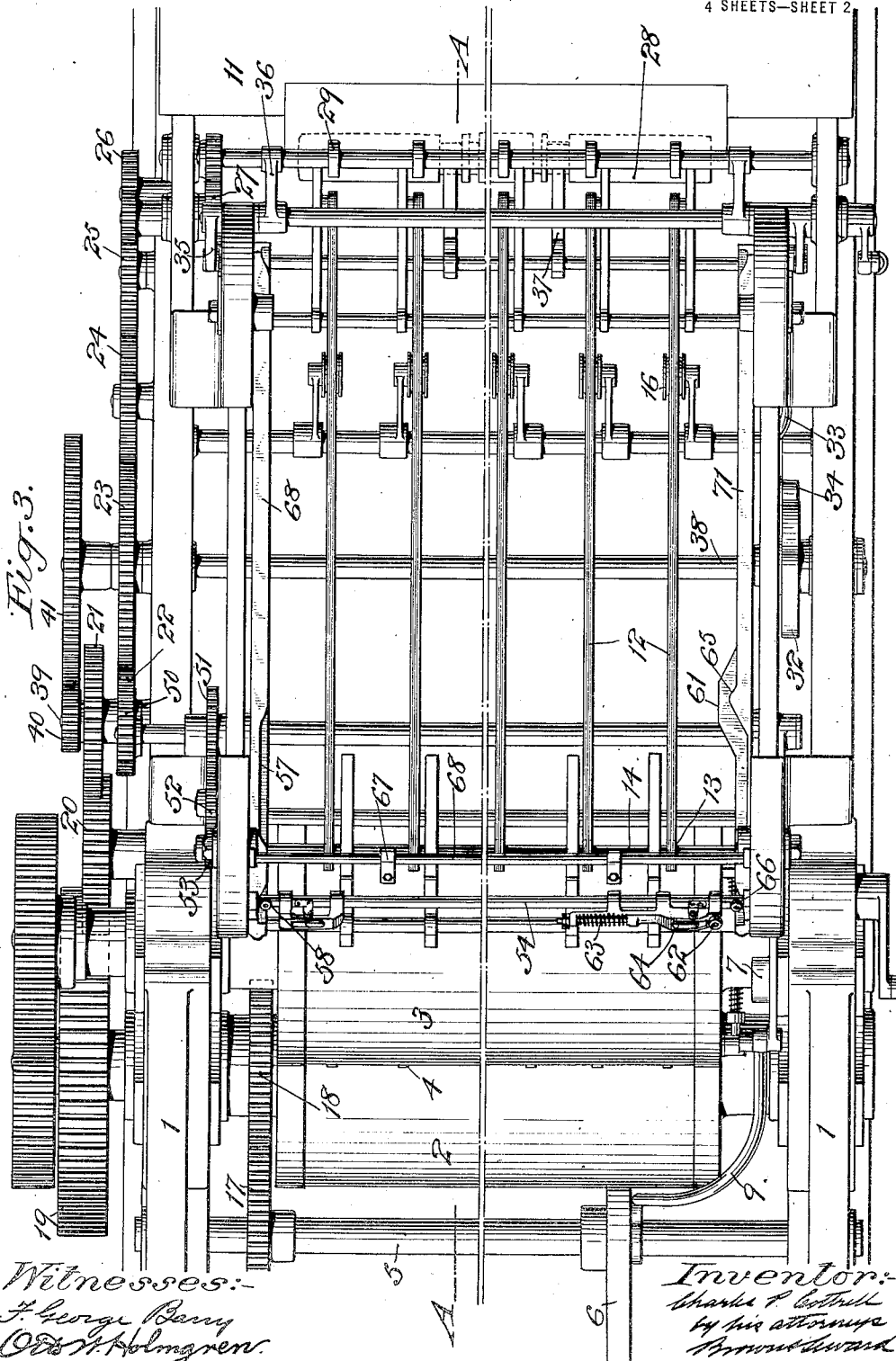
Inventor:
Charles F. Cottrell
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C. P. COTTRELL.
SHEET FEEDING MECHANISM FOR PRINTING PRESSES.
APPLICATION FILED JAN. 25, 1912.

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Patented Feb. 21, 1922.

4 SHEETS—SHEET 2



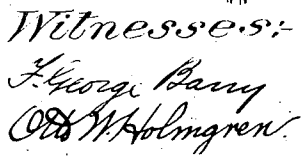
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4 SHEETS—SHEET 3.



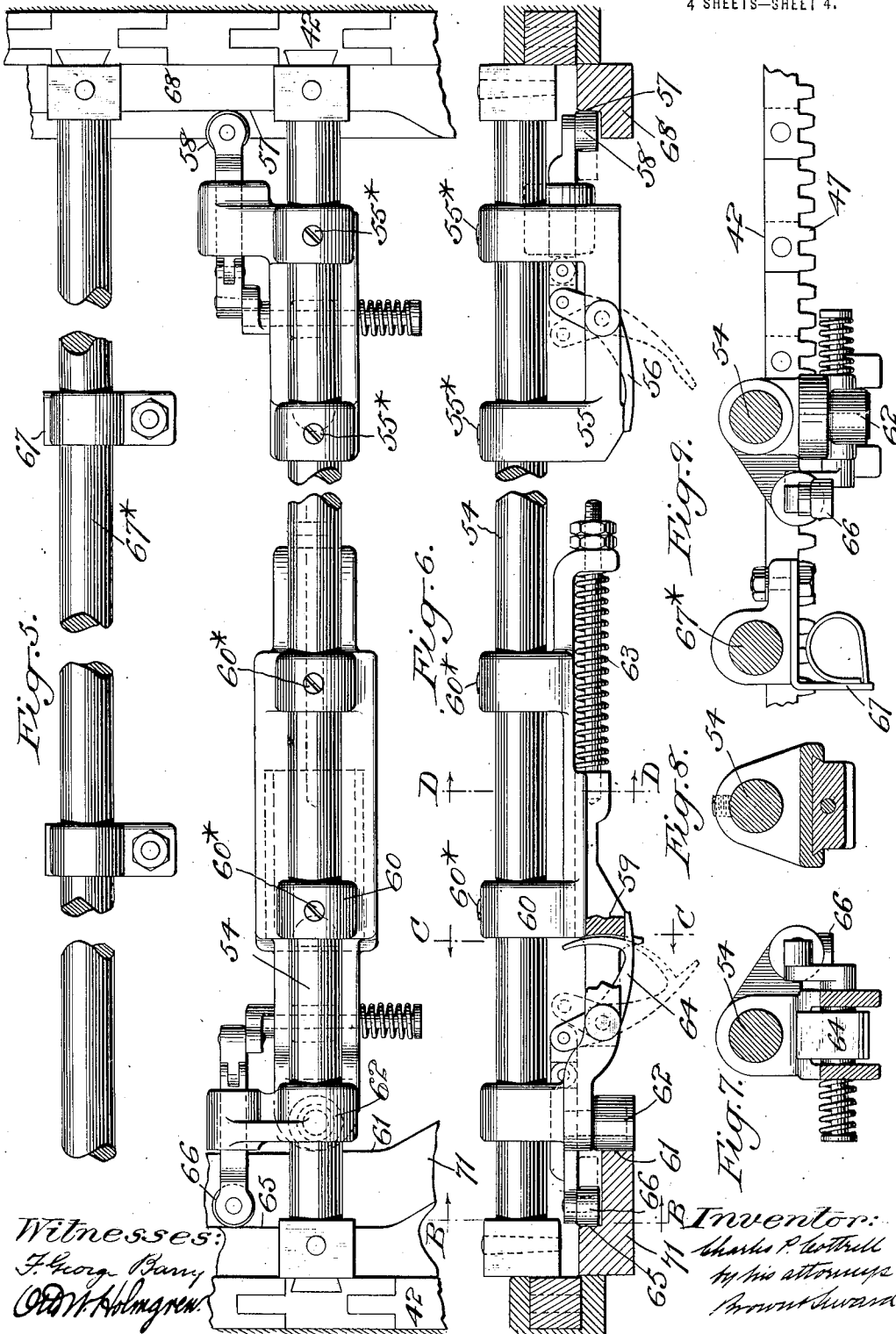
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UNITED STATES PATENT OFFICE.

CHARLES P. COTTRELL, OF WESTERLY, RHODE ISLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO C. B. COTTRELL & SONS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

SHEET-FEEDING MECHANISM FOR PRINTING PRESSES.

1,406,978.

Specification of Letters Patent.

Patented Feb. 21, 1922.

Application filed January 25, 1912. Serial No. 673,441.

To all whom it may concern:

Be it known that I, CHARLES P. COTTRELL, a citizen of the United States, and resident of Westerly, in the county of Washington and State of Rhode Island, have invented a new and useful Improvement in Sheet-Feeding Mechanism for Printing Presses, of which the following is a specification.

The objects of my invention are to provide novel means whereby sheets may be fed rapidly and accurately to a high speed printing press, said means being arranged to automatically bring the sheets into proper end and side register with respect to the printing form while they are in motion:—to provide means whereby the sheet feeding carrier maintains control of the sheets until they are brought under the control of the press: and to provide lateral adjustment for the means which side registers the sheets, whereby sheets of different widths may be registered.

My invention more specifically comprises the following novel features, to wit: an endless sheet carrier traveling at the surface speed of the impression cylinder; a tape carrier traveling at a higher speed than the sheet carrier for transferring the sheets thereto; an intermittently acting positive sheet forwarding device interposed between the feedboard and tape carrier for feeding the sheets on to the tape carrier at proper intervals; and devices carried by the sheet carrier for bringing the sheet into proper end and side register, said sheet carrying grippers maintaining control of the sheet until the impression cylinder grippers shall have secured control of the sheet.

This invention is herein shown in connection with a two-revolution sheet printing press, but it is to be understood that the mechanism is to be used wherever applicable for feeding sheets with proper register.

In sheet feeding mechanism as heretofore commonly constructed, the sheet being fed has been stopped in its movement for end and side registering it. It was then released just before the impression cylinder grippers took the sheets thus leaving the sheets without control. The sheet was thus

still when the impression cylinder grippers closed on it. This, together with the loss of control of the sheet was a frequent cause of bad register in the feeding of the sheet.

In my invention the end and side registering of the sheet is accomplished while the sheet is in motion and traveling at the surface speed of the impression cylinder, thus saving the time heretofore used in registering the sheet.

The grippers on the sheet carrier close on the sheet, thus insuring the feeding of the sheets to the press in perfect register even though the press be driven at a very high speed.

In the drawings,

Fig. 1 is a view in side elevation of the sheet feeding mechanism and so much of a two-revolution sheet printing press as will give a clear understanding of the location and operation of the several mechanisms;

Fig. 2 is a detail section showing the means for operating the grippers on the impression cylinder;

Fig. 3 is a view in top plan of the parts of the feeding mechanism and machine shown in Fig. 1;

Fig. 4 is a longitudinal vertical section through the same, taken in the plane of the line A—A of Fig. 3;

Fig. 5 is a detail top plan view on an enlarged scale of the endless sheet carrier and its adjacent parts including the cams for controlling the movements of the sheet forwarding grippers for side registering and gripping the sheets;

Fig. 6 is a transverse vertical section through the endless sheet carrier and its adjacent parts, the sheet forwarding grippers on the carrier being shown in their closed position in full lines and in their open position in dotted lines;

Fig. 7 is a detail section taken in the plane of the line B—B of Fig. 6;

Fig. 8 is a detail section taken in the plane of the line C—C of Fig. 6;

Fig. 9 is a detail section taken in the plane of the line D—D of Fig. 6;

Fig. 10 is a side view of the right hand laterally adjustable cam bar for controlling

the opening and closing of the sheet carrying grippers at one side of the carrier;

Fig. 11 is a top plan view of the same;

Fig. 12 is a side view of the left hand laterally adjustable cam bar for controlling the bodily movement and the opening and closing of the combined joggers and sheet carrying grippers at the other side of the carrier; and

Fig. 13 is a top plan view of the same.

The framing of the machine is denoted by 1, in which framing the plate cylinder 2 and impression cylinder 3 are mounted in the usual manner. The grippers on the impression cylinder 3 are denoted by 4. The usual means are employed for operating these grippers at predetermined intervals, said means including the cam shaft 5; its box cam 6; the interconnected alternately acting movable cams 7, 8, and operating rod 9 carrying the stud or roller 10 controlled by the box cam 6.

The sheet feed-board is denoted by 11. Between the impression cylinder 3 and the sheet feed-board 11, I locate a horizontally arranged endless tape carrier, the tapes 12 of which are shown as passing over front drive pulleys 13 fixed on the shaft 14 adjacent to the impression cylinder 3; over the back pulleys 14* fixed to the tape carrier drive shaft 15 and the idler pulleys 16. This tape carrier is preferably driven at a greater surface speed than the surface speed of the impression cylinder 3.

A positive sheet forwarding device is interposed between the sheet feed-board 11 and the endless tape carrier, which device is herein shown as comprising a continuously rotating roller 28 and drop rollers 29 arranged to co-act therewith at predetermined times to ensure the proper feed of the sheets from the feed-board 11 onto the endless tape carrier 12. This roller 28 is driven from the main shaft 5 through the gears 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 30, 31. The movement of the drop rollers is controlled from a cam 32, through a connecting rod 33, having a stud or roller 34 engaging the cam 32, the free end of which rod 33 being connected to one arm 35 of the rocking lever, the other arm 36 of which supports the drop rollers 29. A movable sheet stop 37 is interposed between the positive sheet forwarding device and the endless tape carrier and is carried by the arm 35 of the rock lever 35, 36, which carries the drop rollers 29. The drop rollers 29 and the sheet stop 37 are so arranged that as the drop rollers are raised away from the roller 28, the sheet stop will be raised into its operative position, and as the drop rollers are lowered into engagement with the roller 28, the sheet stop will be lowered out of its operative position.

The cam 32 which controls the movement

of the drop rollers 29 and sheet stop 37, is fixed to a shaft 38, which shaft is driven from a shaft 39 through gears 40, 41.

A horizontally arranged endless sheet carrier is located above the endless tape carrier 12, which sheet carrier is arranged to receive the sheets from the tape carrier and transfer them to the impression cylinder. This endless sheet carrier is constructed, arranged and operated to end register and side register sheets of different widths while they are in motion and feed them in such register to the impression cylinder grippers, said sheet carrier being driven at the surface speed of the impression cylinder.

The side chains 42 of this endless sheet carrier pass around front and back pulleys 43 and 44 respectively mounted on shafts 45 and 46. These side chains 42 are toothed as shown at 47, and are engaged by driving gears 48 fixed to a shaft 49, which shaft 49 is in turn driven from the gear 22 through the gear 50. The endless tape carrier is driven by driving the front pulley shaft 14 through a train of gears 51, 52, 53, from the shaft 49.

The sheet forwarding grippers which are carried by the endless sheet carrier, are arranged to engage the opposite edges of the sheet at a short distance from its advance edge. The forwarding grippers at one side have no lateral movement after they have been adjusted to the width of the sheets being fed and the grippers upon the other side have a lateral movement toward and away from the grippers on the other side so as to constitute in themselves combined side joggers and grippers.

The gripper bar is denoted by 54, and is suitably mounted at its ends in the side chains 42 of the endless sheet carrier. At one side of the endless sheet carrier the grippers comprise a fixed jaw 55 adjustably secured to the gripper bar 54 by the set screws 55* and a movable jaw 56, the opening of which movable jaw is controlled by means of a laterally adjustable fixed cam 57 arranged in position to engage a stud or roller 58 connected to the said movable jaw 56.

At the other side of the carrier the grippers comprise a jaw 59 mounted to slide laterally in a bracket 60 adjustably secured to the gripper bar 54, by set screws 60*, the jaw being under the control of a laterally adjustable fixed cam 61 which engages a stud or roller 62 carried by the jaw. A spring 63 interposed between the bracket 60 and the jaw 59, serves to hold the stud or roller 62 against its cam 61. The movable jaw 64 of this gripper is controlled by a laterally adjustable fixed cam 65 which engages a stud or roller 66 carried by said movable jaw.

A traveling sheet stop 67 is carried by the cross bar 67* connected at its ends to the

side chains 42 at a short distance beyond the sheet forwarding grippers, which sheet stop serves as an end registering device for the sheet as will hereinafter more fully appear.

5 The cam 57 for controlling the opening and closing of the grippers at one side of the sheet carrier is located upon a cam bar 68 laterally adjustable along the cross bars 69, 70, and the cams 61, 65, for controlling
10 the jogging and opening and closing of the grippers at the other side of the sheet carrier are located upon a cam bar 71 also laterally adjustable along the cross bars 69, 70. Set screws 72, 73 serve to secure the cam bar 68
15 in proper adjustment and set screws 74, 75, serve to secure the cam bar 71 in proper adjustment.

In operation, the side grippers of the endless sheet carrier and their cams are first adjusted to the particular width of sheets to be fed.

The sheets are then fed from the feed board 11 against the movable sheet stop 37. This feeding may be either by hand or automatic. The sheet stop is then lowered out of the way and the drop rollers 29 are lowered into engagement with the sheet. These rollers will serve to feed the sheet on to the endless tape carrier 12. This endless
30 tape carrier traveling at a greater speed than the endless sheet carrier will feed the sheet forwardly until its advance edge comes in contact with the traveling sheet stop 67. The sheet carrying grippers will be open as the sheet is fed to the traveling sheet stop 67.
35 The combined sheet joggers and grippers at one side of the endless sheet carrier will then be caused to move inwardly by the cam 61 to their extreme limit, thus moving the entire sheet laterally. The said combined joggers and grippers will then be closed into engagement with the side edge of the sheet and it will then be moved laterally outwardly to the limit of their movement, at which time
45 the grippers at the opposite side edge of the sheet will be closed into engagement with the sheet, thereby bringing the sheet into proper register with respect to the printing form while the sheet is in motion and keeping it in such register until the advance edge of the sheet is engaged by the impression cylinder grippers 4. After these side grippers have closed on to the sheet, it will be seen that the traveling end stop 67 is
50 no longer necessary and may travel upwardly out of the way of the advance edge of the sheet even before the advance edge of the sheet is taken by the impression cylinder grippers.

60 It will be seen that a mechanism constructed, arranged and operated in substantially the manner herein shown and described will permit sheets of different widths to be fed to a high speed printing press in
65 perfect end and side register, the registering

of the sheets being accomplished while they are in motion, and the sheets are under the control of their forwarding grippers until they are brought under the control of the impression cylinder grippers.

70 It is evident that various changes might be resorted to in the construction, form and arrangement of the various parts without departing from the spirit and scope of my invention; hence I do not wish to limit myself strictly to the construction herein shown and described, but

What I claim is:—

1. A sheet feeding mechanism for printing presses comprising an endless sheet carrier traveling in a partly circular and partly non-circular path having both a sheet stop for end registering the sheet and side grippers for engaging the side edges of the sheet.

2. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having a sheet stop for end registering the sheet and laterally adjustable side grippers for engaging sheets of different widths.

3. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having a sheet stop for end registering the sheets and combined joggers and grippers for side registering and feeding the sheets to the press.

4. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having a sheet stop for end registering the sheets and laterally adjustable combined joggers and grippers for side registering and feeding sheets of different widths to the press.

5. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having a sheet stop for end registering the sheets and side grippers arranged to engage the sheets at a short distance to the rear of their advance ends.

6. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having a sheet stop for end registering the sheets and laterally adjustable side grippers arranged to engage sheets of different widths at a short distance to the rear of their advance ends.

7. The combination with the impression cylinder of a printing press and its grippers, of an endless sheet carrier having side grippers thereon arranged to engage the side edges of the sheets for feeding the sheets to the impression cylinder grippers, and means for causing the sheet carrier side grippers to maintain control of the sheets until they are engaged by the impression cylinder grippers.

8. The combination with the impression cylinder of a printing press and its grippers, of an endless sheet carrier having laterally adjustable side grippers thereon arranged to engage the side edges of the sheets for

feeding sheets of different widths to the impression cylinder grippers, and means for causing the sheet carrier side grippers to maintain control of the sheets until they are engaged by the impression cylinder grippers.

9. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having grippers for engaging one side edge of the sheet and combined joggers and grippers for engaging the other side edge of the sheet.

10. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having laterally adjustable grippers for engaging one side edge of the sheet and laterally adjustable combined joggers and grippers for engaging the other side edge of the sheet.

11. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having grippers for engaging one side edge of the sheet and combined joggers and grippers for engaging the other side edge of the sheet, said combined joggers and grippers having a lateral movement toward and away from their opposite grippers for side registering the sheet.

12. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having laterally adjustable grippers for engaging one side edge of the sheet and laterally adjustable combined joggers and grippers for engaging the other side edge of the sheet, said combined joggers and grippers having a lateral movement toward and away from their opposite grippers for side registering the sheet.

13. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having grippers for engaging one side edge of the sheet, combined joggers and grippers for engaging the other side edge of the sheet, said combined joggers and grippers having a lateral movement toward and away from their opposite grippers for side registering the sheet, and a sheet stop carried by the endless sheet carrier for end registering the sheet.

14. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having laterally adjustable grippers for engaging one side edge of the sheet, laterally adjustable combined joggers and grippers for engaging the other side edge of the sheet, said combined joggers and grippers having a lateral movement toward and away from their opposite grippers for side registering the sheet, and a sheet stop carried by the endless sheet carrier for end registering the sheet.

15. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having grippers for engaging the opposite side edges of the sheet and means

for moving one of the grippers toward and away from the other grippers for side registering the sheet.

16. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having laterally adjustable grippers for engaging the opposite side edges of the sheet and laterally adjustable means for moving one of the grippers toward and away from the other grippers for side registering sheets of different widths.

17. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having grippers for engaging the opposite side edges of the sheet, means for moving one of the grippers toward and away from the other grippers for side registering the sheet and a sheet stop carried by the endless sheet carrier for end registering the sheet.

18. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having laterally adjustable grippers for engaging the opposite side edges of the sheet, laterally adjustable means for moving one of the grippers toward and away from the other grippers for side registering sheets of different widths and a sheet stop carried by the endless sheet carrier for end registering the sheet.

19. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having grippers for engaging the opposite side edges of the sheet, means for opening and closing the grippers at predetermined times and means for moving one of the grippers toward and away from the other grippers for side registering the sheet.

20. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having laterally adjustable grippers for engaging the opposite side edges of the sheet, laterally adjustable means for opening and closing the grippers at predetermined times and laterally adjustable means for moving one of the grippers toward and away from the other grippers for side registering sheets of different widths.

21. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having grippers for engaging the opposite side edges of the sheet; means for opening and closing the grippers at predetermined times, means for moving one of the grippers toward and away from the other grippers for side registering the sheet, and a sheet stop carried by the endless sheet carrier for end registering the sheet.

22. A sheet feeding mechanism for printing presses comprising an endless sheet carrier having laterally adjustable grippers for engaging the opposite side edges of the sheet, laterally adjustable means for opening and closing the grippers at predetermined

mined times, laterally adjustable means for moving one of the grippers toward and away from the other grippers for side registering sheets of different widths, and a sheet stop carried by the endless sheet carrier for end registering the sheet.

23. A sheet feeding mechanism for printing presses, an endless sheet carrier comprising side chains, a gripper bar supported thereby, grippers carried by said bar for engaging the opposite side edges of the sheet, means for controlling the opening and closing of the grippers and means for moving one of the grippers toward and away from the other grippers for side registering the sheet.

24. In a sheet feeding mechanism for printing presses, an endless sheet carrier comprising side chains, a gripper bar supported thereby, grippers adjustable laterally on said bar for engaging the opposite side edges of the sheet, laterally adjustable means for controlling the opening and closing of the grippers and laterally adjustable means for moving one of the grippers toward and away from the other grippers for side registering sheets of different widths.

25. In a sheet feed mechanism for printing presses, an endless sheet carrier comprising side chains, a gripper bar supported thereby, grippers carried by said bar for engaging the opposite side edges of the sheet, means for controlling the opening and closing of the grippers, means for moving one of the grippers toward and away from the other grippers for side registering the sheet, an end stop bar supported by the side chains beyond the gripper bar and end stops thereon for end registering the sheet.

26. In a sheet feeding mechanism for printing presses, an endless sheet carrier comprising side chains, a gripper bar supported thereby, grippers adjustable laterally on said bar for engaging the opposite side edges of the sheet, laterally adjustable means for controlling the opening and closing of the grippers, laterally adjustable means for moving one of the grippers toward and away from the other grippers for side registering sheets of different widths, an end stop bar supported by the side chains beyond the gripper bar and end stops thereon for end registering the sheet.

27. In a sheet feeding mechanism for printing presses, an endless sheet carrier comprising side chains, a gripper bar supported thereby, grippers carried by said bar for engaging the opposite side edges of the sheet, fixed cams for controlling the opening and closing of the grippers and a fixed cam for moving one of the grippers toward and away from the other grippers for side registering the sheet.

28. In a sheet feeding mechanism for

printing presses, an endless sheet carrier comprising side chains, a gripper bar supported thereby, grippers adjustable laterally on said bar for engaging the opposite side edges of the sheet, laterally adjustable fixed cams for controlling the opening and closing of the grippers and a laterally adjustable fixed cam for moving one of the grippers toward and away from the other grippers for side registering sheets of different widths.

29. In a sheet feeding mechanism for printing presses, an endless sheet carrier comprising side chains, a gripper bar supported thereby, grippers carried by said bar for engaging the opposite side edges of the sheet, fixed cams for controlling the opening and closing of the grippers and a fixed cam for moving one of the grippers toward and away from the other grippers for side registering the sheet, an end stop bar supported by the side chains beyond the gripper bar and end stops thereon for end registering the sheet.

30. In a sheet feeding mechanism for printing presses an endless sheet carrier comprising side chains, a gripper bar supported thereby, grippers adjustable laterally on said bar for engaging the opposite side edges of the sheet, laterally adjustable fixed cams for controlling the opening and closing of the grippers and a laterally adjustable fixed cam for moving one of the grippers toward and away from the other grippers for side registering sheets of different widths, an end stop bar supported by the side chains beyond the gripper bar and end stops thereon for end registering the sheet.

31. A register device for sheets, having forward feeding means; means for gauging the front edge of the sheet while the latter is in motion; and means for moving the feeding means sidewise while feeding the sheet forward.

32. A sheet-feeding mechanism for presses having, in combination, opening and closing sheet grasping means, having parts between which the sheet is grasped, means to impart a carrying movement to said sheet grasping means, and means connected to said sheet-grasping means to shift said sheet-grasping means transversely of said carrying movement automatically to side-register the sheet while firmly grasped by said sheet-grasping means.

33. A sheet-feeding mechanism for presses having, in combination, opening and closing sheet grasping means having parts between which the sheet is grasped, means to impart a carrying movement to said sheet grasping means, side register means connected to said sheet-grasping means to shift said sheet-grasping means transversely of said carrying movement, automatically to position the sheet laterally while firmly grasped by said

sheet-grasping means, and means permitting lateral adjustment of said side-register means.

34. A sheet feeding mechanism for presses
5 having, in combination, sheet grasping means, means to impart a carrying movement to said sheet-grasping means, side-register means automatically to position the sheet laterally while firmly grasped by said
10 grasping means, said side register means including a sheet-edge engaging member, and means permitting lateral adjustment of said engaging member.

35. In a sheet handling and register mechanism, a plurality of successively acting forward feeding means, means for gauging the front edge of the sheet, while the sheet is in motion, and means for moving one of the feeding means sidewise while moving the
20 sheet forward.

36. In a sheet registering device for printing presses, the combination with a printing couple and its sheet-gripping mechanism, of front register devices, means for forwarding
25 a sheet at a speed greater than that of the gripping mechanism to bring the sheet against the register devices and means for then taking the sheet and imparting side register and carrying the sheet into engagement with the gripping mechanism at a speed corresponding with that of the gripping mechanism.

37. In a sheet registering device for printing presses, the combination with a printing couple and its sheet-gripping mechanism, of means for feeding a sheet forward and effecting front and side register without stopping the sheet in its movement comprising front register devices, means for running the sheet forward against the front register devices at a speed greater than that of the gripping means, and means for then taking the sheet and imparting side register and simultaneously feeding it into the gripping mechanism at a speed substantially the same
35 40 45 as that of the gripping mechanism.

38. In a sheet handling and register mechanism comprising a printing couple with gripping mechanism, the combination of feeding means traveling faster than the impression cylinder, moving front stops against which the sheet is registered by the feeding means and means for then forwarding the sheet traveling at the speed of the impression cylinder.
50 55

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this twenty-fourth day of January, 1912.

CHARLES P. COTTRELL.

Witnesses:

F. GEORGE BARRY,
HENRY C. THIEME.