

J. WHITE.
SHEET POSITIONING MECHANISM.
APPLICATION FILED DEC. 14, 1911.

1,378,205.

Patented May 17, 1921.

3 SHEETS—SHEET 1.

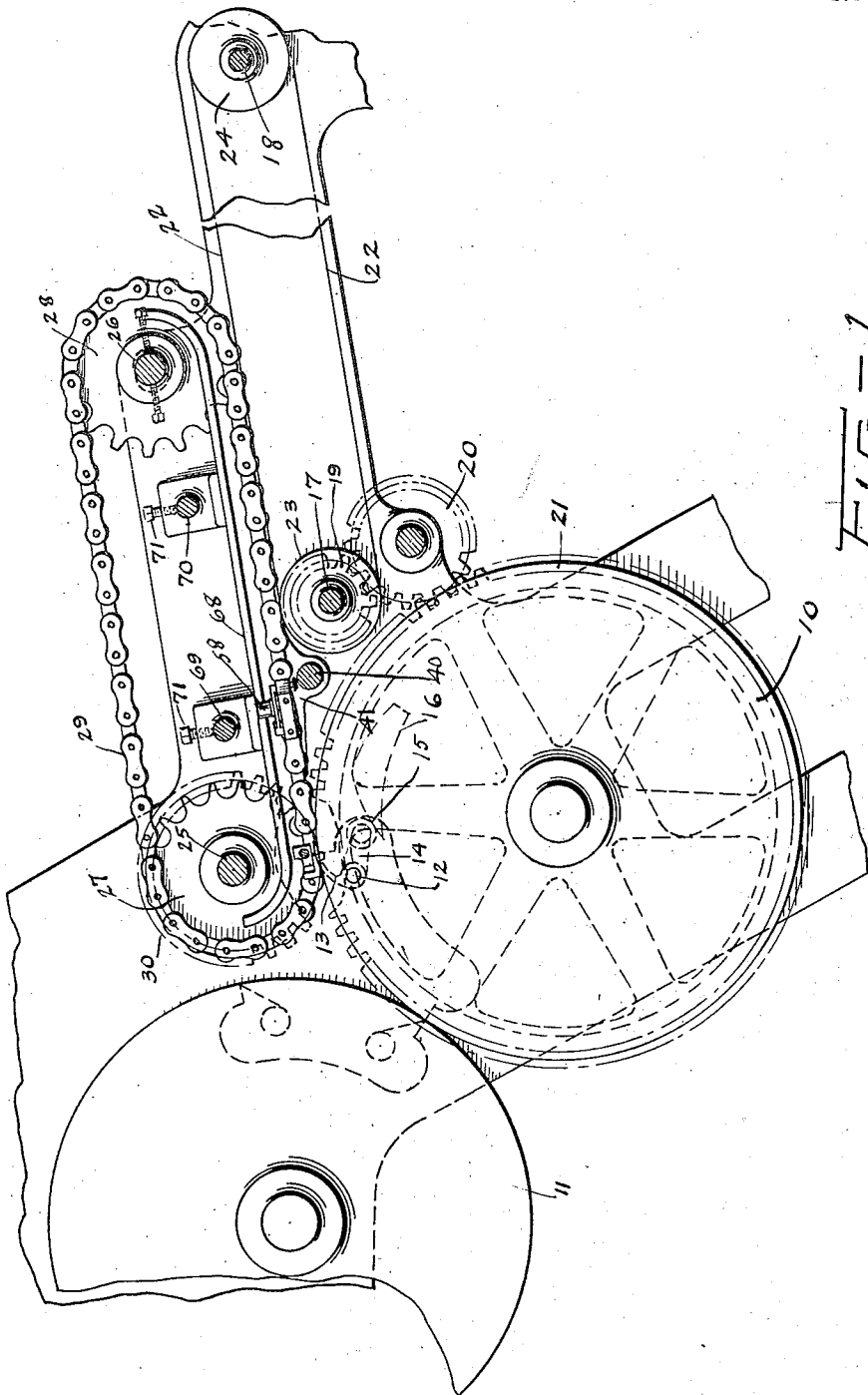


FIG-1

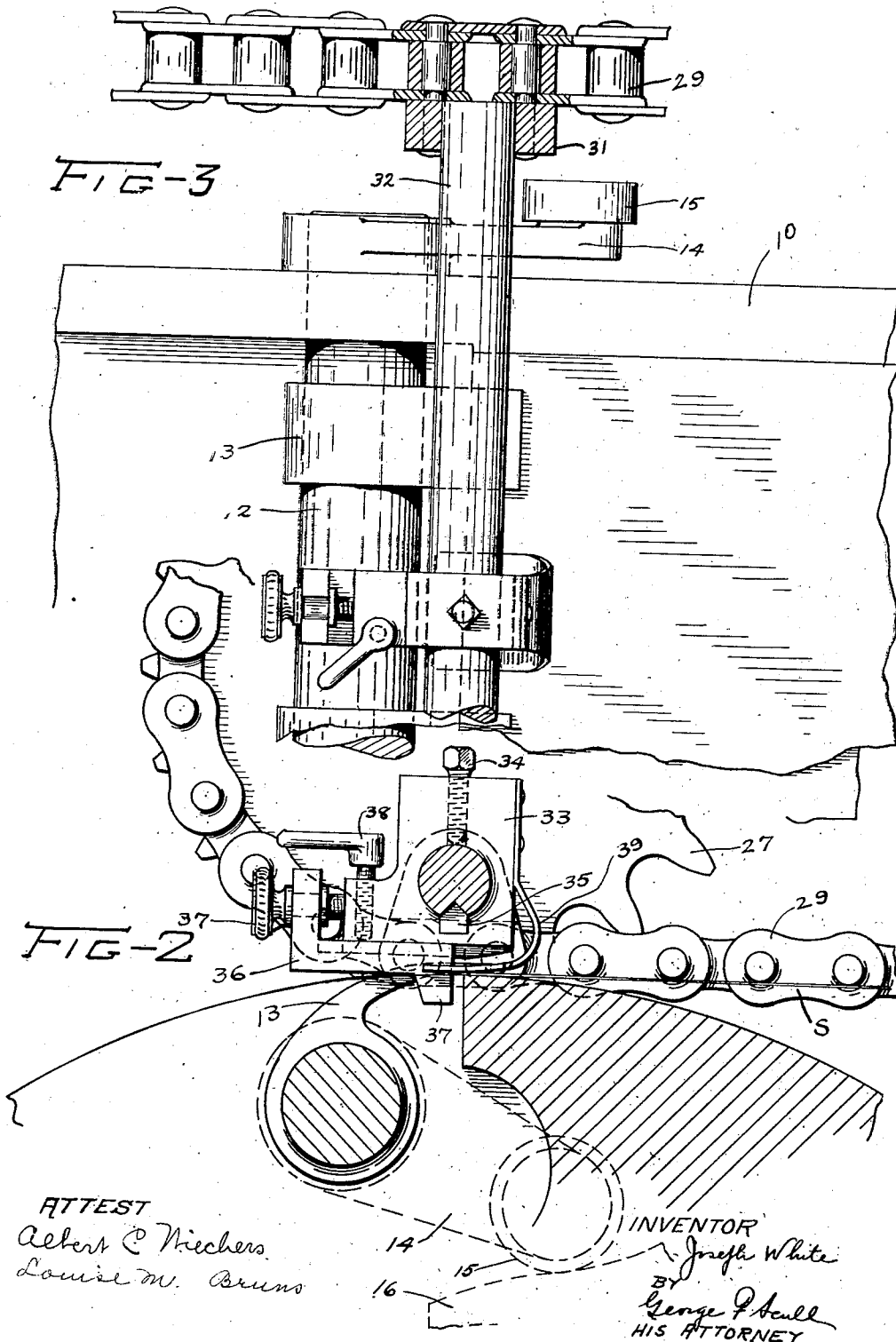
ATTEST
Robert C. Niechers
Louise M. Burns

INVENTOR
Joseph White
BY
George F. Hall
HIS ATTORNEY

J. WHITE.
SHEET POSITIONING MECHANISM.
APPLICATION FILED DEC. 14, 1911.

1,378,205.

Patented May 17, 1921.
3 SHEETS—SHEET 2.



ATTEST
Albert C. Niechers
Louise M. Burns

INVENTOR
Joseph White
BY
George F. Hull
HIS ATTORNEY

J. WHITE,
SHEET POSITIONING MECHANISM.
APPLICATION FILED DEC. 14, 1911.

1,378,205.

Patented May 17, 1921.
3 SHEETS—SHEET 3.

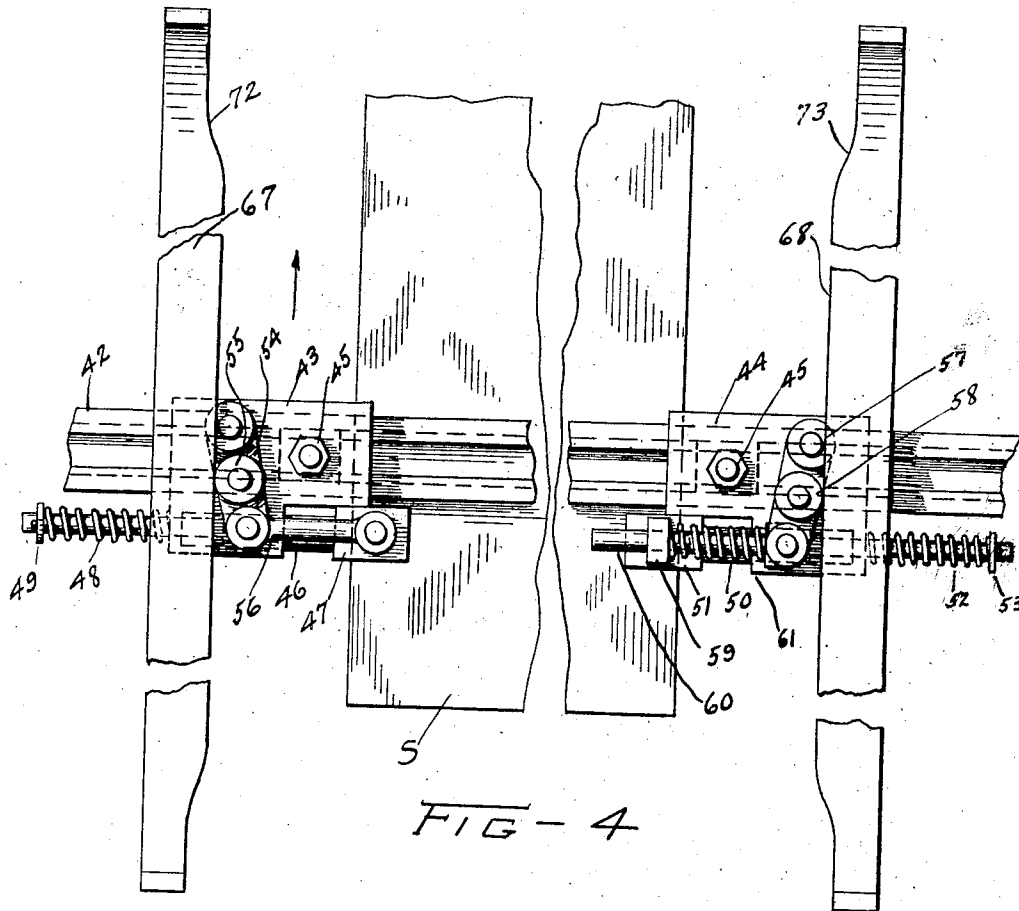


FIG-4

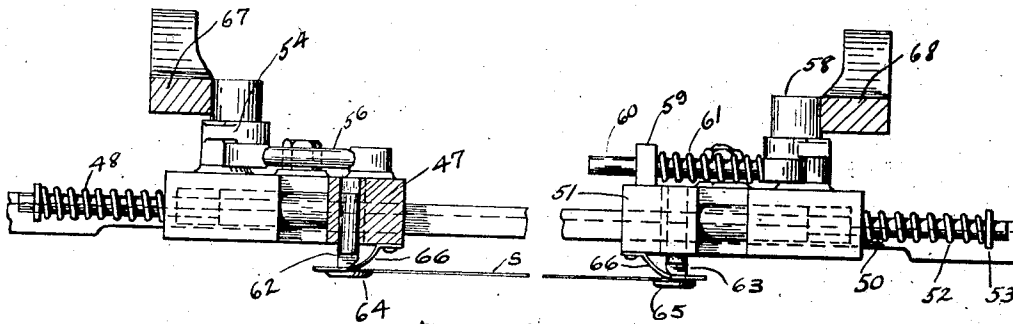


FIG-5

ATTEST
Albert C. Niechers
Louis M. Bruns.

INVENTOR
Joseph White

BY

George P. Hull
HIS ATTORNEY

UNITED STATES PATENT OFFICE.

JOSEPH WHITE, OF PISCATAWAY TOWNSHIP, MIDDLESEX COUNTY, NEW JERSEY, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO HALL PRINTING PRESS COMPANY, OF DUNELLEN, NEW JERSEY, A CORPORATION OF NEW JERSEY, AND ONE-HALF TO MIEHLE PRINTING PRESS AND MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SHEET-POSITIONING MECHANISM.

1,378,205.

Specification of Letters Patent.

Patented May 17, 1921.

Application filed December 14, 1911. Serial No. 665,625.

To all whom it may concern:

Be it known that I, JOSEPH WHITE, a citizen of the United States, residing at Piscataway township, county of Middlesex, State of New Jersey, have invented certain new and useful Improvements in Sheet-Positioning Mechanism; and I do declare the following to be a full, true, and exact description of the said invention, such as will enable others skilled in the art to which it appertains to make use of the same.

This invention relates to mechanism for positioning individual sheets before they are presented to machines for operating on such sheets and particularly to devices for so presenting the sheets to the feeding or impression cylinders of printing machines that each of them will be taken by the sheet taking mechanism of the cylinder so that each sheet will have the same relation to such cylinder as all other sheets. My new mechanism is particularly useful in positioning sheets of heavy or stiff material, such as tin or cardboard, though it is by no means limited to such material. My novel mechanism may be used in connection with any form of sheet handling devices, such as sheet separating devices by which sheets of material are taken up from a pile and presented one by one to the machines, machines in which sheets are cut from a web, or with hand-fed machines. In any form of mechanism for presenting sheets to a machine, it is desirable that the sheet shall be positioned longitudinally and laterally before being acted upon by the machine, and the mechanism to do this should be simple in construction and certain in operation, and preferably the gages for so positioning the sheets should be adjustable for various sized sheets, and it is desirable to provide a mechanism for automatically positioning the sheet without any care on the part of the feeder.

My novel mechanism to accomplish these objects consists of a simple and efficient construction and arrangement of parts as will be more fully described and pointed out in the appended claims.

In the drawings, Figure 1 represents a side

elevation of a portion of a common type of printing press showing my novel mechanism in connection therewith, parts of such mechanism having been removed.

Fig. 2 consists of an enlarged partial section of my positioning mechanism showing particularly the relation between the sheet front gages and the grippers of the impression cylinder of the press used for purposes of illustration.

Fig. 3 is a plan view, partly in section, of Fig. 2.

Fig. 4 is a partial plan view of my novel lateral positioning mechanism.

Fig. 5 is an elevation of Fig. 4.

The corresponding parts are referred to both in the drawings and the following description by similar reference characters.

Referring now particularly to Fig. 1, 10 is an impression cylinder cooperating with a form or other printing cylinder 11, these cylinders in the type of press which I have chosen for purpose of illustration, being geared together and driven by power. Since such driving means are no part of my invention, they are not illustrated. 12 is the usual gripper shaft carrying the usual sheet grippers 13, the shaft 12 having attached at one end thereof the lever 14 carrying a cam roll 15, which as the cylinder 10 rotates, engages with the cam 16 to open and close the grippers in the usual manner. After the grippers are closed, they are held in this position by the usual spring mechanism. Instead of the grippers which I have shown, any other equivalent sheet taking device, such as pins, may be employed.

17 and 18 are shafts rotatably mounted in the frames of the press, the shaft 17 being provided with gear 19 which meshes with an intermediate gear 20, which in turn, meshes with a gear 21 attached to the shaft of the impression cylinder 10. 22 represents a series of endless bands connecting pulleys 23 and 24 mounted respectively on shafts 17 and 18. These belts or bands may be of any material, such as leather, tape or strings. The proportion of the gear 19 to the pulleys 23 is preferably such that the bands 22 move at a greater speed than the

surface speed of the impression surface of the cylinder 10. The shaft 18 may be positioned any distance away from the shaft 17 as will be found most convenient for feeding sheets to the belts. The sheets of material S to be fed to the cylinder 10 are placed on the bands 22 either by hand or by automatic mechanism and the bands 22 are driven in the proper direction to carry such a sheet toward the cylinder 10.

40 is a fixed rod extending between the side frames of the machine and carrying thereon sheet guides 41 the top portions of which serve to support the sheet between the bands 22 and the impression surface of the cylinder 10.

Above the cylinder 10 and the bands 22 are shafts 25 and 26, each provided with a sprocket wheel 27 and 28 at either end of said shafts and each set of sprocket wheels is provided with a chain 29, which thus form a pair of parallel endless belts between shafts 25 and 26. The shaft 25 is provided with a gear 30 meshing with the gear 21 so that in the structure used for purposes of illustration, as the cylinder 10 rotates, the chains 29 are driven at substantially the same speed as the surface speed of the impression cylinder 10, and in such a direction that the lower portion of such chains move toward the cylinder 10.

As shown more in detail in Figs. 2 and 3, the chains 29 have brackets 31 attached thereto on which is mounted a shaft 32 carrying block 33 held adjustably on shaft 32 by a set screw 34 and the spline 35. The block 33 is provided with a front gage 36 having a dependent portion 37 and the gage 36 is slidably mounted on the block 33 and adjusted by the screw 37 and locked in place on block 33 by the screw 38. 39 is a spring adapted to direct a sheet against the dependent portion 37 of the front gage. It will be understood that as many of the front gages 36 as are necessary will be provided on the shaft 32, though two is the preferable number.

As shown particularly in Fig. 1, it will be seen that the front gage 36 moves for a portion of its length toward the cylinder above the bands 22 and parallel therewith, and with its dependent portion 37 in the path of a sheet on the bands 22. In the structure illustrated in the drawings, a sheet placed on the bands 22 will be moved by such bands toward the cylinder 10 at a greater velocity than the velocity of the front gage 36. If such sheet does not have its front edge parallel to the front edge of the impression surface when placed on the bands 22, it will be thrust into such a position by being pressed against the front gages 36, before the edge of the sheet arrives at the point where it will be taken by the grippers of the cylinder 10, the front gages, when two or more are em-

ployed, in connection with the bands 22 acting, therefore, to straighten the sheet. Preferably, I arrange the sprocket chains 29 in such a way that the front gages cut across the path of the impression surface of the cylinder 10. With this arrangement the sheet may be directed tangentially to such impression surface and does not need to be pressed down to such impression surface by the grippers as would be the case if the usual thin steel tongues were used to support the edge of the sheet before being taken by the grippers. As will be readily seen, after the sheet is taken by the grippers, the front gages move away from the sheet by passing around the sprocket wheels 27 and after passing over sprocket wheels 28, again come into the path of the bands 22 ready to receive another sheet.

In the mechanism just described, it will be noted that the front gages move with the sheet up to the point where the grippers close on the sheet and that they then continue to move in the same direction while being lifted out of the path of the sheet. The grippers, of course, close at each revolution of the cylinder at the time when the front edge of the sheet is at a certain predetermined point and preferably I arrange my gage carriers so that the front gages do not alter their relation to the sheet until at about the time the edge of the sheet has arrived at this point and the grippers are closed. The grippers are therefore actually controlling the sheet before the gages are removed. This is possible in the structure I have illustrated because the further motion of the gages is principally with the sheet and not across or against its path, the gages passing from one side to the other or through, and not simply up to, the plane determined by the center line of the cylinder and the position of the edge of the sheet at the time the grippers close.

In order to position the sheet laterally, I provide a bar 42 whose ends are carried in the sprocket chains 29 in a manner similar to that in which the bar 32 is carried. On this bar 42 are mounted blocks 43—44 which are adjustable lengthwise of the bar 42 and held in adjusted position by the set screws 45. In the block 43 is slidably mounted a rod 46 having a head 47 and a spring 48, the latter abutting against the block 43, and a collar 49 fastened to the rod 46. Similarly, block 44 has a rod 50 mounted slidably therein and carrying a head 51, the rod 50 being provided with a spring 52 abutting against the block 44, and the collar 53 fastened to the rod 50. To the block 43 is pivoted a cam lever 54 carrying a cam roller 55. A link 56 connects the lever 54 with the block 47. Similarly to block 44 is pivoted a cam lever 57 carrying a cam roller 58. The block 51 has a projection 59

through which passes one end of a link 60 connected at one end to the lever 57. On this link 60 between the lever 57 and the projection 59 is a spring 61. From each of the blocks 47 and 51, respectively, hang down gages 62 and 63, having projections 64—65 on the ends thereof and springs 66 to direct a sheet into the gap formed between the projections 64—65 and the cutaway portions of the side gages 62—63, as shown particularly in Fig. 5. These projections 64—65 extend under the sheet S being positioned and thus support it, which I have found desirable to obtain accurate registration. The gages 62—63 are mounted in the blocks 47—51 so as to be movable longitudinally therein, being normally held in the positions shown, by the springs 66. When the device is used in connection with a cylinder having a sheet bearing surface, as illustrated, this arrangement permits the gages 62—63 to be pushed up into the blocks 47—51 when they contact with such surface without injury to either the surface or the gages. 67—68 are fixed cams mounted on either end of the rods 69—70 carried in the frames of the machine, such cams being adjustable toward and away from the center of the machine, and held in adjusted position by the set screws 71.

The springs 48 and 52 are arranged to hold the cam rollers 55 and 58 against the cams 67 and 68, respectively, as the bar 42 is carried along by the chains 29 toward the cylinder 10. The cams 67—68 are so designed that, as the bar 42 passes around the sprocket wheel 28 the blocks 47—51 are normally drawn back against the blocks 43—44 by the springs 48 and 52. As the side gages 62—63 pass around the sprocket wheel 28 they come into the plane of a sheet carried on the bands 22, and at the proper time in their travel, as determined by the shape of the cams 67—68, they are moved inward to engage the sheet S. The block 47 and the gage 62 are moved in positively, while the block 51 and the gage 63 are moved in yieldingly by reason of the spring connections 61. The gage 62 serves, therefore, to press the sheet up against the gage 63 and then the spring 61 yields. It will be understood, of course, that this action takes place while the sheet is being progressed toward the cylinder 10 by the bands 22, and is being held against the front gages 36 so that the side gages are working on a sheet which is practically stationary relative to the side gages. As soon as the sheet is taken by the grippers 13, the rollers 55—58 reach the portion of the cams 67—68 indicated by 72—73 and the side gages 62 and 63 are moved back by the springs 48—52. It should be understood that the spring 52 is stronger than the spring 61. This action of the gages serves to carry

the projections 63 from under the sheet so that the sheet is not disturbed as the bar 42 is carried around the sprockets 27.

By reason of the possible lateral adjustment of the blocks 43—44 and of the cams 67—68, the side gages 62—63 may be located so as to position a sheet of any size in proper relation to the cylinder.

After one sheet has been positioned laterally and taken by the grippers 13, the bar 42 with its gages moves with the chains 29 around the sprockets 27 and the sprockets 28, when the rollers 55—58 again engage the cams 67—68 to open the gages 62 and the gages are held in this position as they move into the plane of the sheet on the bands 22, before being closed by the cams 67—68 as the gages move toward the cylinder.

In my preferred form, the operation of my sheet positioning device is as follows: A sheet is placed on the bands 22 which are moving at a greater velocity than the chain 29 or the surface of the cylinder 10, and is carried by the friction of such bands against the front gages 36 which are moving parallel to the sheet and at substantially the same speed as the surface of the impression cylinder. This causes the sheet to be straightened and the front edge of the sheet to have its proper longitudinal relation to the front gages 36 and therefore to the surface of the cylinder 10, since the front gages and the surface have a fixed timed relation by reason of the gearing 21—27. While the sheet is being moved forward, the side gages 62—63 are being closed in by the cams 67—68 until they contact with the sheet. After an edge of the sheet is in contact with each of the side gages 62—63, the sheet is properly positioned laterally and it is not crushed or bent by reason of the yielding of the spring 61. It will be remembered that the sheet during this side positioning operation is being carried toward the impression cylinder 10, which is constantly rotating, and at the proper time and while the sheets are held against the front and side gages, the grippers 13 close thereon.

Since the front and side gages are carried on mechanism positively geared to the cylinder 10, it will be seen that each sheet will be positioned properly in relation to the cylinder.

The cylinder 10, as illustrated in the drawings, is of the continuously rotating type and my sheet positioning mechanism is especially adapted for positioning sheets on such a cylinder, but my device may also be used with cylinders which stop to take a sheet. It is also obvious that it is wholly immaterial whether the cylinder 10 as an impression cylinder coöperates with a rotary form cylinder or a flat bed or a transfer cylinder, and it is also obvious that the cylinder 10 may be merely a feed cylinder or any other de-

vice by which sheets are conveyed to a machine.

While preferably I move the chain 29 at substantially the same surface speed as that of the impression cylinder 10, my invention is not limited to this. The speed of the chain, however, when the sheet is fed to it by the belts 22 must be such as to make the front gages 37 move at a slower speed than that given to the sheet by the belts 22. Provided that there is this relative difference between the speeds of the sheet and of the front gages, it is obvious that the front gages may travel faster or slower than the impression surface, provided they arrive at the sheet feeding and the sheet gripping point at the instant that the grippers close on the sheet. Moving the front gage and the impression surface at the same speed has several advantages, however, since the sheet is taken by the grippers while it is traveling at exactly the same speed as the impression surface, and while the sheet is still being held against the front gages.

While I have shown as my preferred form of carrier for my front gages and side gages the endless traveling carrier 29, it is obvious that many of the same objects may be accomplished by mounting these gages on any form of carrier, as, for instance, a reciprocating one, which will move them toward the cylinder while they are positioning the sheet.

It will be understood that the gages are in reality the front surfaces of the members against which the sheet bears and not the whole member itself with all of its adjusting and supporting devices. Theoretically, the gage could be a surface only but practically it must have some thickness to support it. It will be understood, however, that when, in this specification and the following claims I describe the gages as having a certain motion or position, I am referring to the effective part of the gage, which is the surface which contacts with the sheets.

While preferably I use my sheet positioning device in connection with an automatic sheet presenting device, such as the belts 22, many features of my device may be used if the sheet is presented to the feeding point of the cylinder entirely by hand.

It is also possible for certain purposes to use either my novel front gages or my novel side gages alone and not necessarily in combination as I have shown for purposes of illustration, although I prefer to so use them.

While I have shown and described my new side gages as consisting of a gage on either side of the sheet, which gages are moved toward the sheet and toward each other as the gages themselves progress toward the cylinder, I do not wish to be limited to this particular form. It is possible,

for instance, to fix one of the side gages, allowing the sheet to be adjusted laterally entirely by one gage. This might be readily accomplished by moving the cam 67 away from engagement with the roller 54, so that the block 47 with its gage 62 remains pressed back against block 43 by the spring 48. This then becomes a fixed gage against which the sheet will be pressed by the gage on the block 51. In such a case, if the gages are mounted on a chain as 29, it will be necessary to move the projection 64 from beneath the sheet S before the projection passes around the sprocket 27, or the projection 64 may be dispensed with altogether, which might readily be done, since this projection is not a necessary part of my invention. It is also possible to position the sheet laterally by causing one of my traveling side gages to push the sheet against a fixed side gage instead of a traveling one.

My device for straightening and positioning a sheet laterally and longitudinally may be used with a support which does not bring the sheet directly to the machine, but which delivers it in a straightened and adjusted position to another conveyer which does move it to the machine. In other words, it is possible to use so much of my device as is illustrated by the bands 22 and the carrier 29 and the gages supported thereby at any stage of the travel of a sheet toward a machine which is to operate on the sheet. It is also obvious that any other form of sheet conveyer, such as a reciprocating carriage, may be used in place of my traveling bands 22.

Having now described my invention, what I claim is:

1. A rotatable sheet carrying cylinder, movable sheet front gages, mechanism constructed and arranged to support and continuously move said gages in a path which intersects the path of travel of the sheet carrying surface of said cylinder and means to position a sheet laterally while its front edge is against said front gages.

2. Sheet supporting and propelling means, movable front stops, an endless carrier constructed and arranged to support and move said stops parallel to and in the path of a sheet under control of said supporting and propelling means, and at a slower speed than that of such sheet, and means, operable independently of said front stops, to position the sheet laterally while under the control of said supporting and propelling means.

3. A continuously rotating sheet carrying cylinder, a sheet carrier constructed and arranged to support and move a sheet placed thereon toward said cylinder and at a greater velocity than the velocity of the sheet carrying surface of said cylinder,

a sheet front gage independent of said cylinder and an endless carrier constructed and arranged to support and move said gage in the path of said sheet and at a velocity less than that of the sheet and means, operable independently of said stops, to position said sheet laterally while on said carrier.

4. A continuously rotating sheet carrying cylinder, sheet grippers thereon, means to move a sheet toward the feeding point of said cylinder at a greater velocity than the velocity of the sheet carrying surface of said cylinder, sheet front gages independent of said cylinder and movable in the path of the sheet, means to move said gages at a velocity less than that of the sheet and means to close said grippers on the sheet while it is positioned against said gages.

5. A continuously moving sheet carrier, sheet taking means thereon, a movable sheet support constructed and arranged to move a sheet toward said carrier, sheet gages independent of said carrier, means to support and move said gages in the path of a sheet on said support and at a velocity less than that of said support and means to cause said sheet taking means to engage a sheet on said support while the sheet is held against said gage.

6. A continuously rotating sheet carrying cylinder, sheet grippers thereon, movable sheet front gages, mechanism constructed and arranged to support said gages and to move them in a path intersecting the path of the sheet carrying surface of said cylinder and at a velocity, when crossing said path, substantially equal to that of said sheet carrying surface and means to move a sheet against said gages while they are in motion and before they cross said path.

7. A rotatable sheet carrying cylinder, sheet grippers thereon, movable sheet front gages, mechanism constructed and arranged to support said gages and to move them in a path intersecting the path of the sheet carrying surface of said cylinder, and means to move a sheet against said gages while they are in motion and before they cross said path.

8. In a printing machine, a rotatable cylinder, sheet taking devices thereon, sheet front gages and mechanism to support said gages and to move them up and past said feeding point, means to move a sheet against said gages while they are in motion and before they pass said feeding point and mechanism to engage said sheet taking devices with a sheet while it is held against said gages.

9. A rotatable cylinder, sheet taking devices thereon, sheet front gages and mechanism to support said gages and to move them up and past said feeding point, sheet supporting and propelling means constructed

and arranged to move a sheet against said gages before they pass said feeding point and at a greater velocity than said gages are being moved and mechanism to engage said sheet taking devices with a sheet while it is held against said gages.

10. A continuously moving sheet carrying cylinder, sheet grippers thereon, sheet front gages, a bar to support said gages and on which they are adjustable lengthwise and crosswise, means for supporting and moving said bar, constructed and arranged to move said gages in a path intersecting the path of the sheet carrying surface of said cylinder and at a velocity, when crossing said path, substantially equal to that of said surface, and means to move a sheet against said gages before said gages cross the path of said surface.

11. A continuously rotating sheet carrying cylinder, a movable sheet support constructed and arranged to move a sheet placed thereon toward said cylinder, means to move said sheet support at a speed greater than that of the sheet carrying surface of said cylinder, movable sheet front gages constructed and arranged to move in the path of a sheet carried by said sheet support and means to move said gages at substantially the same speed as the speed of said sheet carrying surface.

12. A continuously rotating sheet carrying cylinder, propelling means constructed and arranged to move a sheet toward said cylinder at a speed greater than that of the sheet carrying surface of said cylinder, movable sheet front gages constructed and arranged to move in the path of a sheet controlled by said propelling means and means to move said gages at substantially the same speed as the speed of said sheet carrying surface.

13. A continuously rotating sheet carrying cylinder, sheet gripping means thereon, a movable sheet support constructed and arranged to move a sheet placed thereon toward said cylinder, means to move said sheet support at a speed greater than that of the sheet carrying surface of said cylinder, and movable sheet front gages constructed and arranged to move in the path of a sheet carried by said sheet support and tangentially to the path of said sheet carrying surface, means to move said gages at substantially the same speed as the speed of said surface and means to close said sheet gripping means on a sheet while it is held against said front gages.

14. A pair of endless carriers, means to move said carriers continuously, a bar supported by said carriers, sheet side gages mounted on said bar and means to move one of said side gages toward the other.

15. A bar, mechanism to support and move said bar, a pair of blocks mounted on said bar and adjustable longitudinally thereof, a

sheet side gage movably mounted in each of said blocks, a cam roller connected to each of said gages, and fixed cams constructed and arranged to engage with said rollers, 5 said cams being constructed to cause said gages to move toward each other as said bar moves.

16. A bar, mechanism to support and move said bar, a pair of blocks mounted on said bar and adjustable longitudinally thereof, a sheet side gage movably mounted in each of said blocks, a cam roller connected to each of said gages, and fixed cams constructed and arranged to engage with said rollers, 15 said cams being constructed to cause said gages to move toward each other as said bar moves, said cams being adjustable toward and away from each other.

17. A sheet support, a bar, mechanism 20 constructed and arranged to support and move said bar above said sheet support and longitudinally thereof, a sheet side gage on said bar and means to move a sheet crosswise of said sheet support to position it 25 against said gage.

18. A sheet support, a bar, endless carriers constructed and arranged to support and move said bar, sheet side gages on said bar and means to operate said gages to position 30 the sheet on said sheet support.

19. A movable sheet support, a movable sheet side gage, mechanism above said support constructed and arranged to support and move said gage with said support, said sheet gage extending into the plane of a sheet carried by said support and having a projection adapted to extend under said sheet. 35

20. A movable sheet support, a movable sheet side gage, mechanism above said support constructed and arranged to support and move said gage with said support, said sheet gage extending into the plane of a sheet carried by said support and having 45 a projection adapted to extend under such sheet, and said mechanism being constructed and arranged to move said gage into and out of the plane of said sheet.

21. A sheet support, a movable sheet side gage, normally extending into the plane of a sheet carried by said support, mechanism constructed and arranged to support and move said gage in the plane of such sheet, said gage being also mounted to be moved 55 at right angles to said plane.

22. A sheet support, a movable sheet side gage, normally extending into the plane of a sheet carried by said support, mechanism constructed and arranged to support and move said gage in the plane of such sheet, said gage being also mounted to be moved 60 at right angles to said plane, and means to hold said gage yieldingly in its normal position.

65 23. A sheet support, a bar, mechanism

constructed and arranged to support and move said bar above said sheet support, sheet side gages on said bar arranged to lie in the plane of a sheet on said sheet support, means to move said gages toward each other to engage the edges of a sheet, projections on said side gages adapted to extend under the sheet and means to move said gages away from each other and said projections from under the sheet. 70

24. A sheet support, a bar, mechanism 75 constructed and arranged to support and move said bar above said sheet support, sheet side gages on said bar, arranged to lie in the plane of a sheet on said sheet support, and means to move one of said gages yieldingly toward the other. 80

25. A sheet support constructed and arranged to move a sheet, a carrier movable above said sheet support, means to move 85 said carrier at a less velocity than that of a sheet on said sheet support, sheet front gages and a sheet side gage on said carrier, adapted to lie in the plane of the sheet on said support, and means to operate 90 said side gage to position the sheet laterally on said support.

26. Means to support and propel a sheet, mechanism independent of said means, constructed and arranged to position a sheet 95 laterally and longitudinally on said means while the sheet is moving, and mechanism to move said first-named mechanism at a speed different from that of said sheet supporting and propelling means. 100

27. A set of endless carriers, means to move said carriers, sheet front gages and sheet side gages supported on and moved by said carriers, means to move a sheet against said front gages and means to position the sheet against said side gages, while both said front gages and said side gages are moving. 105

28. A set of movable carriers, means to move said carriers, sheet front gages and a sheet side gage mounted on said carriers, means independent of and unconnected to said carriers, adapted and arranged to move a sheet against said front gages, and means to position the sheet against said side gage, while said carriers are moving. 115

29. Sheet supporting and propelling means, a movable sheet side gage, mechanism above said supporting and propelling means constructed and arranged to support 120 and move said gage with a sheet under the control of said supporting and propelling means, said gage extending into the plane of the sheet and having a projection adapted to extend under the sheet. 125

30. The combination with a feed-board and a member receiving the head of the sheets from the feed-board, of sheet feeding devices for advancing the sheet over the feed-board, and sheet stops moving 130

with the sheet over the feed-board and controlling the head of the sheet as it is transferred to the receiving member.

31. The combination with a feed-board and a member receiving the head of the sheets from the feed-board, of sheet stops moving with the sheet over the feed-board and controlling the head of the sheet as it is transferred to the receiving member, and frictional sheet-feeding devices acting to press the sheet on the feed-board against the stops and moving at a higher rate of speed than the stops.

32. The combination with a feed board and a member receiving the head of the sheets from the feed board, of sheet feeding devices for advancing the sheet over the feed board, and sheet stops moving with the sheet over the feed-board and controlling the head of the sheet until it is positioned ready to be transferred to the receiving member.

33. In a sheet handling and register mechanism, a preliminary feeding means traveling faster than the impression cylinder, moving front stops against which the sheet is registered by the preliminary feeding means, a second feeding means taking the sheet from the preliminary feeding means and traveling at the speed of the impression cylinder, and means for moving the second feeding means sidewise to side register the sheet.

34. The combination with a feed-board and a member receiving the head of the sheets from the feed-board, of sheet feeding devices for advancing the sheet over the feed-board, belts running with the sheet over the feed-board and carrying sheet stops controlling the head of the sheet as it is transferred to the receiving member.

35. A sheet feeding mechanism for printing presses comprising endless means traveling in a partly circular and partly non-circular path for feeding the sheets to the press and devices carried by the sheet feeding means for bringing the sheets into both end and side register with respect to the printing form while they are in motion.

36. A sheet feeding mechanism for printing presses comprising endless means traveling in a partly circular and partly non-circular path for feeding the sheets to the press and devices carried by the sheet feeding means for bringing the sheets into both end and side register with respect to the printing form while they are in motion, and maintaining control of the sheets until they are brought under the control of the press.

37. A sheet feeding mechanism for printing presses comprising endless means traveling in partly circular and partly non-circular path for feeding the sheets to the press and laterally adjustable devices carried by the sheet feeding means for bringing sheets

of different widths into proper register with respect to the printing form while they are in motion, and maintaining control of the sheets until they are brought under the control of the press.

38. A sheet feeding mechanism for printing presses comprising endless means traveling in a partly circular and partly non-circular path for feeding the sheets to the press and a device carried by the sheet feeding means for bringing the sheets into proper side register with respect to the printing form while they are in motion.

39. A sheet feeding mechanism for printing presses comprising endless means traveling in a partly circular and partly non-circular path for feeding the sheets to the press and a device carried by the sheet feeding means for bringing the sheets into proper side register with respect to the printing form while they are in motion, and maintaining control of the sheets until they are brought under the control of the press.

40. A sheet feeding mechanism for printing presses comprising endless means traveling in a partly circular and partly non-circular path for feeding the sheets to the press and a laterally adjustable device carried by the sheet feeding means for bringing sheets of different widths into proper side register with respect to the printing form while they are in motion.

41. A sheet feeding mechanism for printing presses comprising endless means traveling in a partly circular and partly non-circular path for feeding the sheets to the press and a laterally adjustable device carried by the sheet feeding means for bringing sheets of different widths into proper side register with respect to the printing form while they are in motion, and maintaining control of the sheets until they are brought under the control of the press.

42. A sheet feeding mechanism for printing presses comprising an endless sheet carrier traveling in a partly circular and partly non-circular path and laterally adjustable means carried thereby for registering sheets of different widths in the carrier while they are being conveyed to the press, and maintaining control of the sheets until they are brought under the control of the press.

43. A sheet feeding mechanism for printing presses comprising an endless sheet carrier traveling in a partly circular and partly non-circular path and means carried thereby for side registering the sheets in the carrier while they are being conveyed to the press.

44. A sheet feeding mechanism for printing presses comprising an endless sheet carrier traveling in a partly circular and partly non-circular path and means carried thereby for side registering the sheets in the carrier while they are being conveyed to the press, and maintaining control of the

sheets until they are brought under the control of the press.

45. A sheet feeding mechanism for printing presses comprising an endless sheet carrier traveling in a partly circular and partly non-circular path and laterally adjustable means carried thereby for side registering sheets of different widths in the carrier while they are being conveyed to the press.

46. A sheet feeding mechanism for printing presses comprising an endless sheet carrier traveling in a partly circular and partly non-circular path and laterally adjustable means carried thereby for side registering sheets of different widths in the carrier while they are being conveyed to the press and maintaining control of the sheets until they are brought under the control of the press.

47. A sheet feeding mechanism for print-

ing presses comprising an endless sheet carrier traveling in a partly circular and partly non-circular path and means carried thereby for end and side registering the sheets in the carrier while they are being conveyed to the press.

48. A sheet feeding mechanism for printing presses comprising an endless sheet carrier traveling in a partly circular and partly non-circular path and means carried thereby for end and side registering the sheets in the carrier while they are being conveyed to the press, and maintaining control of the sheets until they are brought under the control of the press.

JOSEPH WHITE.

Witnesses:

GEORGE F. SCULL,
ALBERT C. WIECHERS.