J. R. BLAINE.

SHEET GUIDE ADJUSTMENT.

APPLICATION FILED JUNE 23, 1916.

1,367,229.

Patented Feb. 1, 1921.

2 SHEETS—SHEET 1.

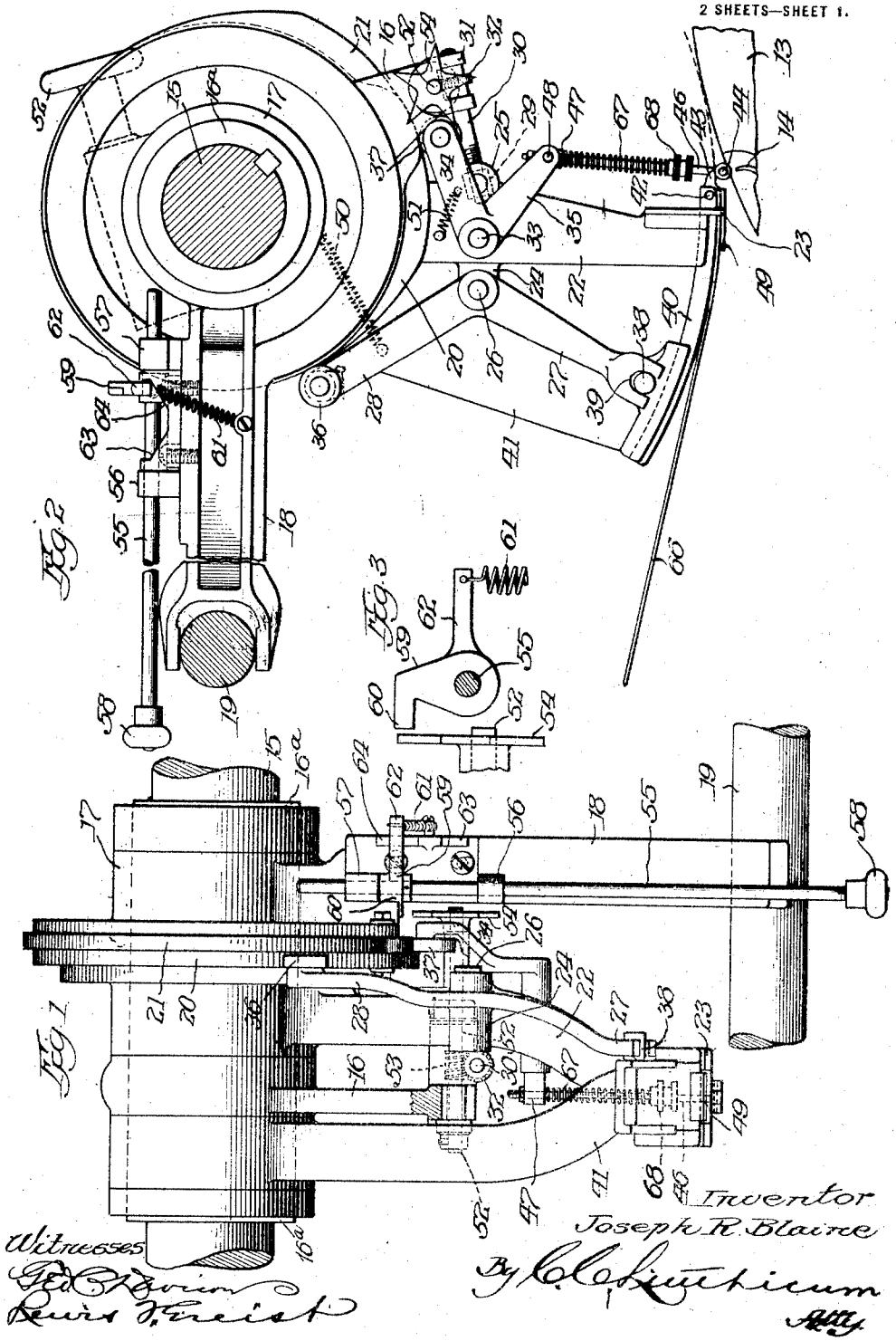


Fig. 2

Fig. 3

Fig. 1

Witnesses
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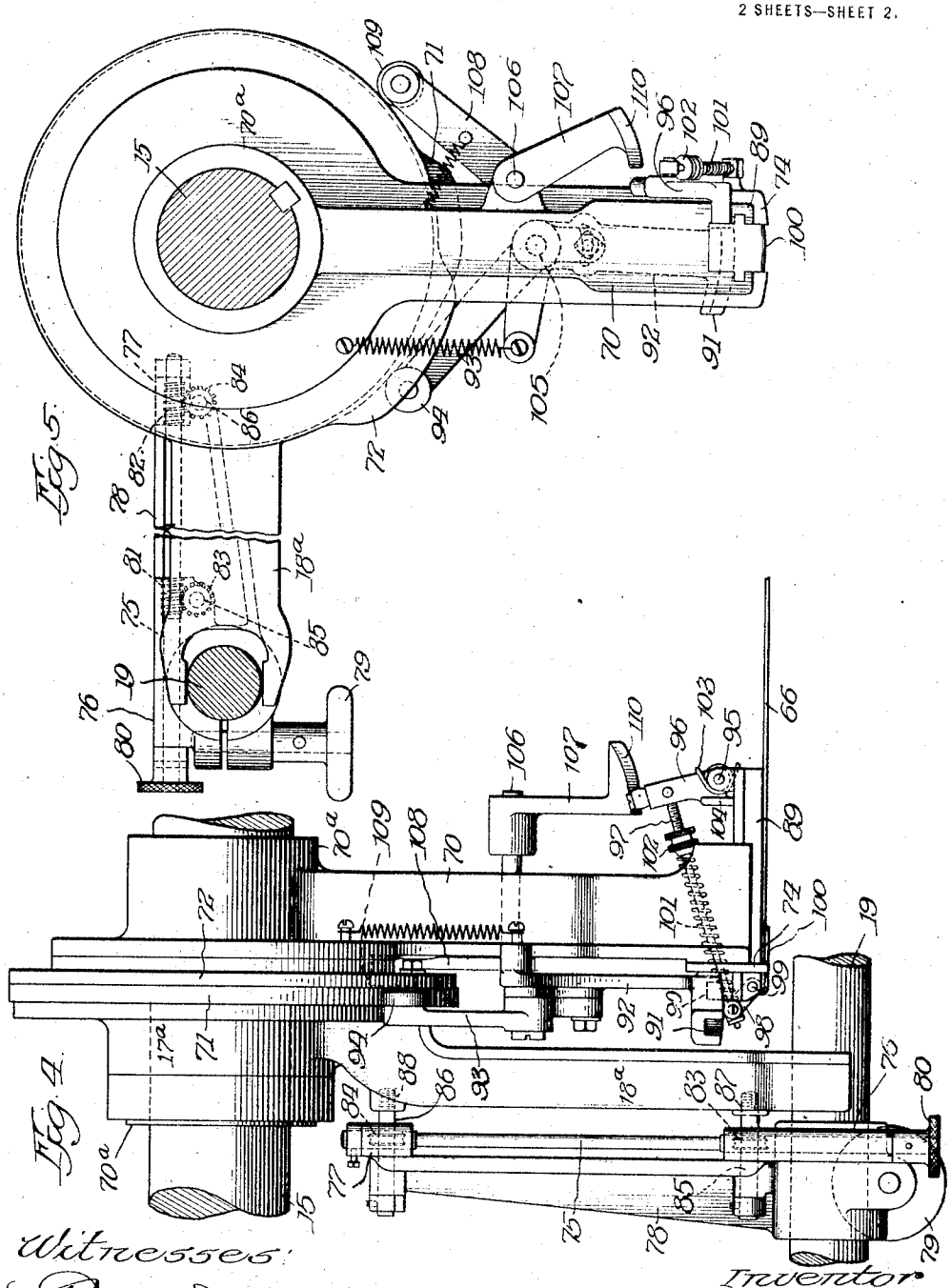


Fig. 5.

Fig. 4.

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JOSEPH R. BLAINE, OF OAK PARK, ILLINOIS, ASSIGNOR TO MIEHLE PRINTING PRESS & MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SHEET-GUIDE ADJUSTMENT.

1,367,229. Specification of Letters Patent. Patented Feb. 1, 1921.

Application filed June 23, 1916. Serial No. 105,323.

To all whom it may concern:

Be it known that I, JOSEPH R. BLAINE, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sheet-Guide Adjustments, of which the following is a specification.

With few exceptions, it has been customary heretofore to feed the sheets individually to a printing press against substantially stationary gages or guides, so that during the travel of the paper it is necessarily stopped in its movement, at least momentarily, to secure the desired registration. In such cases the inertia of the paper must be instantly overcome when the grippers of the impression cylinder, which are constantly traveling at full speed, grasp the sheet and transfer it to the cylinder. As will be appreciated, in a structure of that character the gages and grippers must operate with great precision to secure registration of the sheet and its transfer or clamping to the rapidly traveling impression cylinder. In other words, when a sheet of paper is gaged and gripped in a press of this kind the stationary sheet has instantaneously imparted to it the full speed of travel of the impression cylinder periphery, which renders accurate registration difficult if not impossible. Moreover, an instant before the grippers close, the guides must get out of the way, leaving the sheet uncontrolled during this instant, affording a further chance for error in getting accurate register.

In my Patent No. 1,292,968 dated January 28, 1919 I have set forth a construction having for its object the provision of means for securing accurate front and side registration of sheets fed to a printing couple without stopping the sheet in its forward movement and at substantially the speed of the sheet taking grippers and the impression cylinder, whereby the full speed capacity of the press is utilized without its being limited in any way by the necessary registering process, while the correct registry of the sheet is in no way impaired by the speed of sheet travel.

In the several forms of construction above referred to provision was made for adjusting the position of the front and side gages in order to secure accurate register, but to make such adjustment it was necessary for the pressman noting any inaccuracy, to stop the press, make the adjustment as nearly correct as could be estimated, start the press, note whether the adjusted position was the correct one, and possibly again stop the press to more accurately adjust the gage. By the present invention the adjustment is effected while the press is running whenever it is found that the register is inaccurate due to atmospheric conditions or any other cause.

In order that the invention may be readily understood I have illustrated and described a preferred embodiment of the same in connection with a form of registering mechanism of that type shown in my patent above referred to, it being understood that its field of usefulness is not thus limited, and that the invention is readily susceptible of embodiment in other and varied constructional forms adopting it to other forms of sheet register mechanisms. In the drawing—

Figure 1 is a plan view of a front registering and adjusting mechanism embodying the invention;

Fig. 2 is a view of the same in side elevation, with the revolving parts displaced 90° from the position shown in Fig. 1;

Fig. 3 is a detail; and

Figs. 4 and 5 are views similar to Figs. 1 and 2 showing an embodiment of the side registering and adjusting mechanism.

Front register.

Having reference to the drawings (Figs. 1 and 2) the impression cylinder is indicated at 13 provided with its grippers 14, while adjacent and in parallel relation thereto is suitably mounted in the frame of the press a shaft 15 driven at a speed corresponding with that of the shaft of the impression cylinder.

An arm 16 is keyed upon the shaft 15 by means of an extended boss 16^a whereon is loosely mounted a collar 17 held stationary by means of an arm 18 which takes over the fixed rod 19 extending between the side frames of the press. The stationary collar 17 bears cams 20 and 21 the purpose of which will hereinafter appear.

Loosely mounted upon said boss 16^a of the arm 16 is a gage arm 22 carrying the front gage 23 and having projecting therefrom lugs 24, 25 to the former of which is fulcrumed by the pivot 26 an angle lever 27, 28,

while the lug 25 serves as a mounting for a swivel block 29 screw threaded for engagement by a screw 30 mounted within a bearing yoke 31 and having thereon a worm wheel 32. Fulcrumed on the gage arm 22 by the pivot 33 is an angle lever 34, 35. The arm 28 of the first mentioned angle lever carries a roller 36 adapted to travel on the cam 20 while the arm 34 of the other angle lever carries a roller 37 adapted to travel on the cam 21.

To the arm 27 of the first angle lever is connected by means of a pin 38 and a slot 39 an arcuate shoe 40 extending laterally from another arm 41 which is likewise loosely mounted upon the boss 16ª. To the extreme front end of the shoe 40 is pivoted at 42 by means of a link 43 and a second pivot 44 the lower end of a rod 46 which latter is mounted to slide within a swivel block 47 mounted at 48 in the outer end of the arm 35 of the second angle lever. The link 43 has projecting beyond its pivot 42 a flipper 49, the purpose of which will hereinafter be made clear. A spring 50 serves to hold the roller 36 against its cam while a similar spring 51 serves the same purpose with reference to the roller 37.

It should be understood that the shaft 15 extends the full width of the press and that a counterpart of the mechanism above described is mounted upon the said shaft 15 and the rod 19 near the two sides of the press, that is to say, separated a distance slightly less than the width of the paper to be fed, so that a front gage is provided for effecting register of the sheets at the front edge and adjacent each side. The bosses 16ª are slidable longitudinally upon the shaft 15 so as to properly position the two registering mechanisms in order to act upon the sheet at the proper point of the latter. The position of each having been determined, the arm 16 is clamped upon the shaft 15 by means of the set screw device 52 acting in an obvious manner.

In order to provide for the adjustment of the front gages 23 of the two mechanisms in exact transverse alinement and in the proper position longitudinally to effect accurate front register, the arm 16 has journaled therein a shaft 52 having formed thereon a worm 53 in mesh with the worm wheel 32 and also carrying a star wheel 54, which latter can be manually rotated when the press is standing idle to position the gage 23 by swinging the gage arm 22 toward or from the fixed arm 16 by means of the screw 30.

In order to effect this adjustment while the press is running, there is mounted on the arm 18 a shift rod 55 slidable in guides 56, 57 having at its one end a handle 58 and intermediate its length a trip 59 (Fig. 3) having a nose 60 normally held out of the orbit of the star wheel 54 by a spring 61 acting on a tail piece 62 but arranged to be projected into said orbit by double cam surfaces 63, 64 when the rod is shifted in its guides 56, 57. It will be understood that when the rod 55 is in its medial position with the tail piece 62 between the two cam surfaces 63, 64, the tripping device will clear the star wheel, whereas if it is shifted to the left the trip will be tilted by the cam 63 and will engage the star wheel outside the axis of the latter, and if shifted to the right, it will be tilted by the cam 64 and will engage the star wheel inside the axis of said wheel. Thus, in the intermediate position of the trip, the star wheel is cleared and the adjustment of the gage 23 is unaffected, while shifted to the left the star wheel will be rotated in one direction and in the opposite direction when the trip is shifted to the right, the gage 22 being gradually advanced or retracted relative to the grippers, according as the rod 55 is shifted in one direction or the other, until the pressman ascertains that the gage is properly positioned, when he will shift the rod to the intermediate inoperative position.

The press being now in motion, the gage arm 22 revolves and carries with it the front gage 23 at a peripheral speed corresponding exactly to that of the grippers upon the impression cylinder by reason of its being tied to the arm 16 by means of the screw 30. The angle levers 27, 28 and 35, 36 likewise revolve with the arm 22, being fulcrumed thereto respectively at 26 and 33.

As the sheet 66 is fed to the press its front edge comes against the front gage 23 or approximately in that position, usually within a sixteenth to a quarter of an inch therefrom. The roller 37 riding upon the cam 21 acts through the lever 34, 35 compressing the spring 67 and thus resiliently acting upon the links 43 and the flipper 49 whereby the latter is closed upon the forward end of the sheet 66 frictionally gripping the same between the flipper and the lower face of the shoe 40, the degree of said spring pressure being regulable by means of the knurled nut 68.

Immediately thereafter the roller 36 riding upon the cam 20 moves the angle lever 27, 28 thereby advancing the shoe 40 and the flipper 49 relative to the gage arm 22 and the gage 23, the gage traveling at the speed of the grippers and the shoe 40 at a slightly greater speed by reason of the action of the lever. The sheet thus gripped at its forward edge between the flipper 49 and the shoe 40 is likewise advanced until it comes in contact with the gage 23 whereupon meeting with this obstruction the sheet conforms to the speed of the gage while the shoe 40 continues to move at a faster speed.

The front gage 23 continues its movement

at the speed of the grippers on the impression cylinder, the sheet being held against the shoe 40 and abutting the gage 23 by the flipper 49 until the grippers on the impression cylinder have gripped the forward end of the sheet. This transfer takes place on the tangent point of the shoe 40 with the impression cylinder 13 so that the flipper 49 and the grippers 14 can both be acting on the sheet at the tangent point, and in fact an instant later. During the next one-eighth inch travel of the cylinder beyond the tangent point, the shoe 40 has moved the flipper forward out from under the sheet so that the latter is left free to continue its path on the impression cylinder. The roller 37 then clears the high part of cam 21 and the flipper 49 is opened by the action of the spring 51 and is then ready to receive the next sheet as it comes into position. Similarly roller 36 clears the high part of cam 20 and spring 50 restores the lever to its original position with the shoe 40 retracted as indicated, ready for the next cycle.

Side register.

Upon the shaft 15 outside the two mechanisms for effecting front register of the sheet as above described, is a similar organization of mechanism for effecting side register of the sheet (Figs. 4 and 5). Herein the side gage arm 70 is keyed to the shaft 15 by means of an extended boss 70^a, and a similar collar 17^a is loosely mounted upon the boss 70^a and held in stationary position by means of the arm 18^a embracing as before the shaft 19. This collar is provided with a cam 71 in one plane and another cam 72 in a different plane. The side gage arm 70 carries the side gage 74, the position of which is adjustable transversely of the press and longitudinally of the shaft 15 by means of a spindle 75 journaled at 76 and 77 in a bearing arm 78 clamped on the rod 19 by the clamp screw 79, the spindle having a knurled head 80 and provided with worms 81, 82 in mesh respectively with worm wheels 83, 84 on shafts 85, 86 transversely journaled in the bearing arm 78 and having their ends in threaded engagement at 87, 88 with the arm 18^a.

Transversely slidable within the gage arm 70 is a shoe 89 carrying a roller 90 which works within an oblique slot 91 of an angle lever 92, 93, the opposite arm of which lever has a roller 94 arranged to travel upon the cam 71. The other end of the shoe 89 opposite the roller 90 has pivoted thereto at 95 an arm 96 connected by means of a rod 97 with a link 98 pivoted at 99 to the shoe 89, which link 98 is extended to form a flipper 100. The rod 97 is surrounded by a compression spring 101, the tension of which is adjustable by means of the knurled nut 102. A coil spring 103 much stiffer than 101 holds the stop 104 of the arm 96 against shoe 89. The angle lever 92, 93 is fulcrumed to the gage arm 70 upon a pivot 105, and similarly pivoted to said arm at 106 is an angle lever 107, 108, the arm 108 of which is provided with a roller 109 arranged to ride upon the cam 72, while the opposite arm 107 of said lever has an offset portion provided with an inclined face 110 adapted to engage the arm 96 whereby to open and close the flipper 100.

In use, the flipper 100 is normally closed being held in this position by the tension of the springs 101 and 103. As the sheet is approached approximately to the gage 23 for front register as previously described the cam roller 109 rides upon the cam 72 opening the flipper 100 to allow the side edge of the sheet to pass and to offer no hindrance to the action of the front register. Front register having been obtained the roller 109 rides off the cam 72 closing the flipper 100 upon the sheet 66 at the side thereof. Shortly thereafter the roller 94 rides upon the cam 71 bringing the oblique slot 91 to bear through the roller 90 upon the shoe 89, drawing the sheet 66 to the left, as shown in Fig. 4, against the side gage 74, the flipper sliding upon the sheet during the further lateral movement of the flipper and shoe after the side registration of the sheet.

At the moment the grippers close on the sheet, the flipper 100 still has hold of the sheet and during the next one-eighth inch of travel of the cylinder, the flipper slips off the sheet and allows it to pass freely to the impression cylinder. The flipper then remains closed until the next cycle starts. After the sheet is taken the roller 94 rides off of high part of cam 71 bringing the shoe 89 back to its starting position.

If the pressman finds that the side register is imperfect due to the side gage being inaccurately positioned laterally of the sheet path, he without stopping the press, turns the head 80 of the spindle to the left or right as may be indicated and thus through the worms 81, 82 and the worm wheels 83, 84 acting through the shafts 85, 86 shifts the collar 17^a and with it the side gage 74 into a proper position so that the register is perfect.

I claim:

1. In a printing press, the combination with the impression cylinder, and its grippers, of means for imparting front register to a sheet fed to the cylinder comprising a gage-support moving forwardly with the sheet, a micrometer connection between the gage and support, and stationary means to actuate the micrometer mechanism to vary the adjustment of said connection whereby to advance or retard the position of the gage while the press is in motion.

2. In a printing press, the combination

with the impression cylinder, and its grippers, of means for imparting front register to a sheet fed to the cylinder comprising two arms mounted for revolution about a common center, a gage carried by one of the arms and traveling in an orbit to which the plane of the sheet path is tangent, a micrometer connection between the two arms, and stationary means to actuate the micrometer connection whereby to advance or retard the position of the gage in its orbit while the press is in motion.

3. In a printing press, the combination with the impression cylinder, and its grippers, of means for imparting front register to a sheet fed to the cylinder comprising two arms mounted for revolution about a common center, a gage carried by one of the arms and traveling in an orbit to which the plane of the sheet path is tangent and at a speed corresponding substantially to that of the grippers, a micrometer connection between the two arms, a star wheel on the micrometer connection, a stationary trip device mounted adjacent the orbit of the star wheel, and means to shift the trip device from a position to clear the star wheel to engaging positions on both sides of the orbit of the star wheel axis to effect the periodic rotation of the latter in either direction at will whereby to advance or retard the position of the gage in its orbit while the press is in motion.

4. In a printing press, the combination with the impression cylinder, and its grippers, of means for imparting front register to a sheet fed to the cylinder comprising two arms mounted for revolution about a common center, a gage carried by one of the arms and traveling in an orbit to which the plane of the sheet path is tangent, and at a speed corresponding substantially to that of the grippers, a micrometer screw connection between the two arms including a worm and worm wheel, a star wheel on the axis of the micrometer screw connection, a stationary trip device mounted adjacent the orbit of the star wheel, and means to shift the trip device from a position to clear the star wheel to engaging positions on both sides of the orbit of the star wheel axis to effect the periodic rotation of the latter in either direction at will whereby to advance or retard the position of the gage in its orbit while the press is in motion.

5. In a printing press, the combination with the impression cylinder, and its grippers, of means for imparting front register to a sheet fed to the cylinder comprising two arms mounted for revolution about a common center, a gage carried by one of the arms and traveling in an orbit to which the plane of the sheet path is tangent, and at a speed corresponding substantially to that of the grippers, a micrometer screw connection between the two arms including a worm and worm wheel, a star wheel on the axis of the micrometer screw connection, a shift rod mounted in stationary guides, a trip device mounted on the shift rod, yielding means normally holding the trip device in a position to clear the star wheel, means coöperating with the shift rod as the latter is shifted in one direction or the other to project the trip device into engaging position with the star wheel on one side or the other of the orbit of the star wheel axis to effect the periodic rotation of the latter in either direction at will whereby to advance or retard the position of the gage in its orbit while the press is in motion.

6. In a printing press, the combination with the impression cylinder, and its grippers, of means for imparting front register to a sheet fed to the cylinder comprising two arms mounted for revolution about a common center, a gage carried by one of the arms and traveling in an orbit to which the plane of the sheet path is tangent, and at a speed corresponding substantially to that of the grippers, a micrometer screw connection between the two arms including a worm and worm wheel, a star wheel on the axis of the micrometer screw connection, a shift rod mounted in stationary guides, a trip device rockingly mounted on the shift rod, a spring normally holding the trip device rocked in a position to clear the star wheel, and a pair of cam surfaces arranged to act on the trip device in opposition to the spring as the rod is shifted to project the trip device into engaging position with the star wheel on one side or the other of the orbit of the star wheel axis to effect the periodic rotation of the latter in either direction at will whereby to advance or retard the position of the gage in its orbit while the press is in motion.

7. In a printing press, the combination with the impression cylinder, and its grippers, of means for imparting side register to a sheet fed to the cylinder comprising a side gage moving forwardly with the sheet, and stationary means to shift the side gage laterally of the sheet path whereby to position the same while the press is in motion.

8. In a printing press, the combination with the impression cylinder, and its grippers, of means for imparting side register to a sheet fed to the cylinder comprising a side gage moving forwardly with the sheet, a stationary gage support, a micrometer connection between the gage and support, and means for actuating the micrometer mechanism whereby to shift the gage laterally with reference to the sheet path while the press is in motion.

9. In a printing press, the combination with the impression cylinder, and its grippers, of means for imparting side register to a sheet fed to the cylinder comprising a

side gage moving forwardly with the sheet, a stationary gage support, a stationary gage abutment, a micrometer screw connection between the gage support and abutment, and means to actuate the micrometer mechanism to shift the abutment and with it the gage laterally of the sheet path whereby to position the gage while the press is in motion.

10. In a printing press, the combination with the impression cylinder, and its grippers, of means for imparting side register to a sheet fed to the cylinder comprising a side gage moving forwardly with the sheet, a stationary gage support, a stationary gage abutment, a micrometer mechanism connecting the support and abutment and including worms and worm wheels, and means to actuate the micrometer mechanism whereby to shift the gage abutment and with its gage transversely of the sheet path to adjust the position of the gage while the press is in motion.

11. In a printing press, the combination with the impression cylinder, and its grippers, of means for imparting side register to a sheet fed to the cylinder comprising a shaft, a gage arm mounted on the shaft to rotate therewith but slidable axially thereon, a gage carried by the arm and moving forwardly with the sheet, a stationary support, an abutment collar loosely mounted upon the shaft and bearing against the gage arm, a micrometer screw connection between the support and abutment collar, and means for actuating the micrometer mechanism whereby to shift the abutment collar and with it the gage arm longitudinally of the shaft to position the gage laterally of the sheet while the press is in motion.

12. In a printing press, the combination with the impression cylinder, and its grippers, of means for imparting front and side register to a sheet fed to the cylinder comprising gage-supports moving forwardly with the sheet, front and side gages adjustably connected to the supports, and stationary means to vary the adjustment of said connections whereby to adjust the position of the gages while the press is in motion.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOSEPH R. BLAINE.

Witnesses:
LEWIS T. GREIST,
MILTON T. MILLER.