

J. WHITE.
SHEET REGISTERING MECHANISM.
APPLICATION FILED JAN. 3, 1912.

Patented Aug. 20, 1912.
2 SHEETS—SHEET 1.

1,036,169.

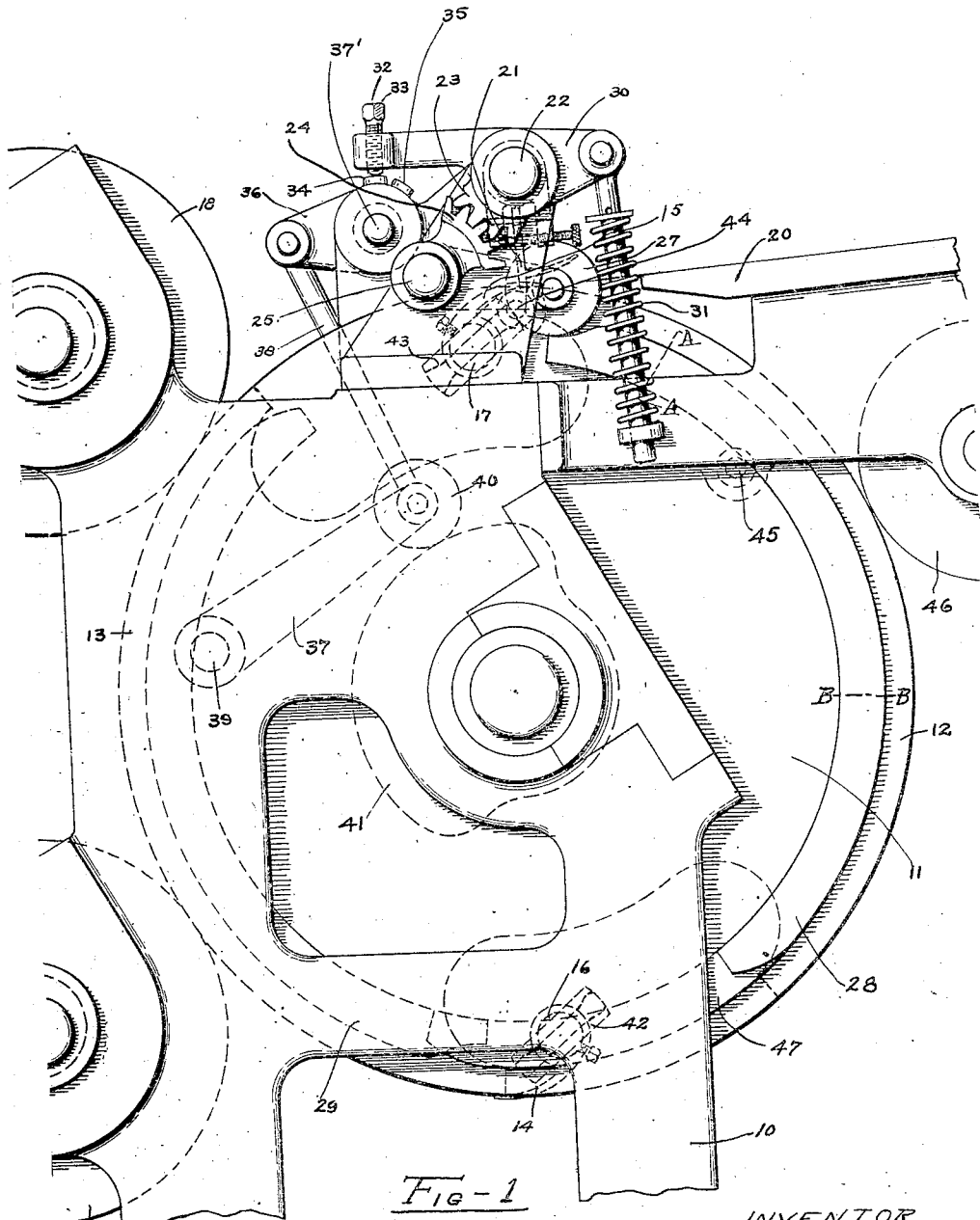


Fig-1

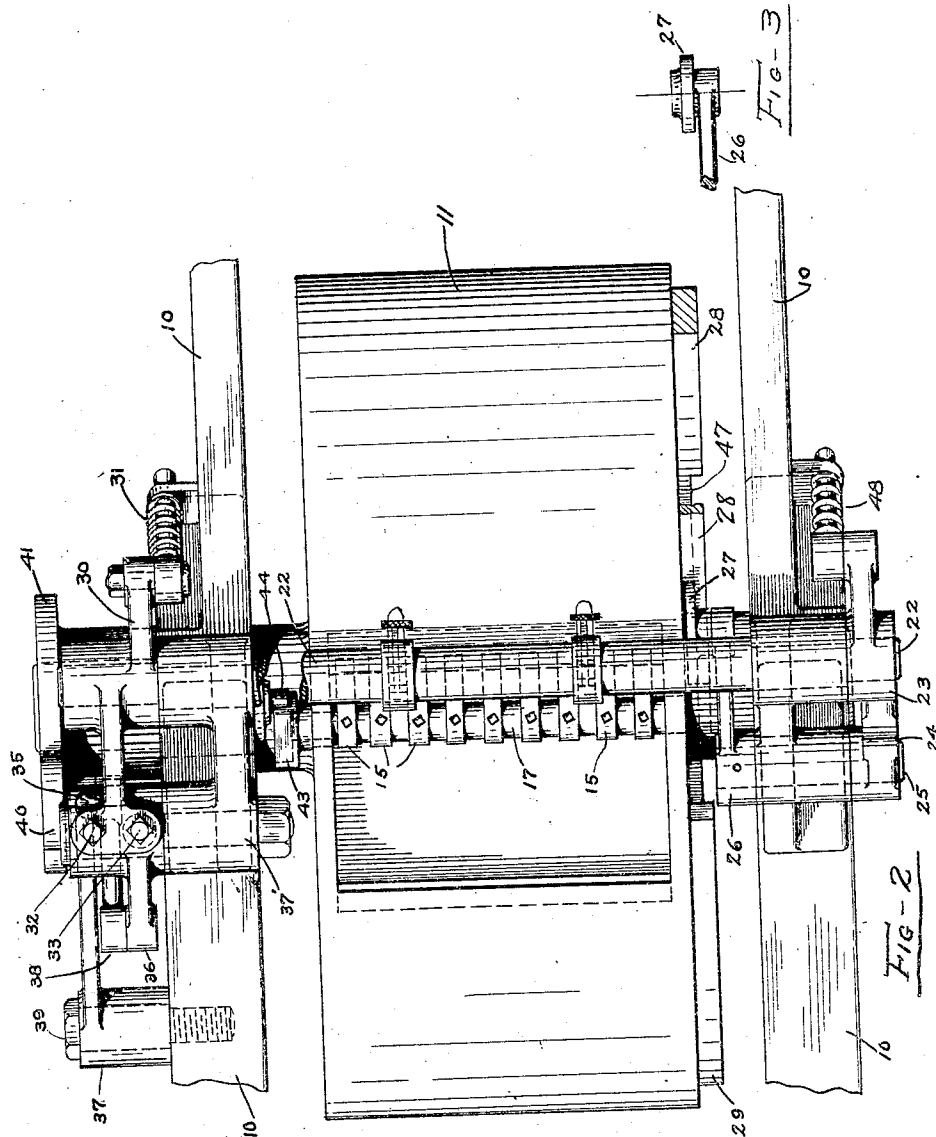
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SHEET REGISTERING MECHANISM.
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2 SHEETS—SHEET 2.



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SHEET-REGISTERING MECHANISM.

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To all whom it may concern:

Be it known that I, JOSEPH WHITE, a citizen of the United States, residing in Piscataway township, Middlesex county, State of New Jersey, (post-office address, Boundbrook, New Jersey,) have invented certain new and useful Improvements in Sheet-Registering Mechanisms; 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 particularly to printing machinery in which an impression cylinder or the like is provided with a plurality of sets of sheet taking devices which close at a given point in their path of travel to take sheets from a feed board or other sheet presenting means. As ordinarily constructed, these sheet taking devices are grippers mounted on an oscillatory shaft and adjustably held thereon so that they may be positioned as desired by the operator. This shaft is operated at certain points in its travel with the cylinder so as to open and close the grippers on sheets presented to the grippers. When these grippers are adjusted or positioned by the operator, there is always a tendency to alter the position of the shaft in relation to the operating means, usually a cam or pin by which the shaft is rotated to close the grippers. When the cylinder is provided with only one set of grippers, this alteration of the relative position of the operating means and the grippers is immaterial since at each cycle of rotation of the cylinder, the grippers will close at exactly the same point after they are once adjusted. When, however, the cylinder is provided with two or more sets of grippers, each of which close at substantially the same point in the rotation of the cylinder, it is probable, unless some special means is provided to prevent it, that each of these sets of grippers will not close at identically the same position. If this occurs, it will be seen that in a series of sheets each presented to the cylinder in one and the same position, the front edge of some of the sheets will have one relation and of some, another relation to the grippers which engage those sheets. This is particularly true when the grippers are closed by the ordinary tumbler operating on the usual fixed pin inserted in the side frame

of the machine. With this device, the point at which the grippers will close on a sheet will be determined by the point at which the tumbler leaves the tumbler pin and this point in turn will be determined by the relative position which the grippers, when closed on their abutments, have with the tumbler slot. As pointed out before, the adjustment of the grippers tends to vary the angle which this tumbler slot bears to the circumference of the cylinder. This variation, when there is only one set of grippers in the cylinder, is immaterial, but when two or more sets are used, it is practically impossible to set each set of grippers so that the tumbler slot for each set will occupy exactly the same angle to the circumference of the cylinder and each set of grippers will consequently have a closing point slightly different from that of any other set of the series. It therefore becomes impossible, without some special provision, to set the front gages and the form so that each sheet will be printed in the same register.

My invention consists of an arrangement by which this difficulty may be overcome and by which the closing or engaging point of the sheet taking devices will have exactly the same relation to sheets presented to them.

With this and other objects in view, the invention consists of certain novel features of construction and arrangement of parts which will be more fully described and pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation of a portion of a printing press, showing the impression cylinder and portions of a feed board, a delivery cylinder, and a pair of plate or form cylinders; Fig. 2 represents a plan view of Fig. 1 with a portion of the cam 28 from line A--A to line B--B removed to show the construction of cam 47; Fig. 3 represents a fragment of some of the parts shown in Fig. 2 but in a slightly different position.

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

In the drawings 10 represents the side frames of the printing press which I have selected to illustrate my invention.

11 represents an impression cylinder having two impression surfaces, 12 and 13, and

two sets of grippers 14 and 15, mounted respectively on the shafts 16 and 17. The impression cylinder 11 is rotatably mounted in the frames 10, and 18 and 19 represent form cylinders also rotatably mounted in the side frames 10, it being understood that the form cylinders 18 and 19 are geared to the impression cylinder 11 in the usual manner.

20 represents a portion of the feed board on which the sheets are laid in the usual manner to present the front edges thereof to the cylinder 11 so that they may be engaged by the grippers 14 and 15.

21 represents a front gage of the ordinary type mounted on the shaft 22. On the front end of the shaft 22, there is a segment 23, engaging with a segment 24 attached to short shaft 25. The segment 23 is provided with an arm engaged by the spring 48. On the rear end of shaft 25 is a lever 26 carrying a cam roller 27. This cam roller 27 engages with the cams 28 and 29 in a manner to be more fully described hereafter.

On the shaft 22 is mounted a lever 30 against which presses a spring 31 which, with spring 48 normally holds the front gage 21 in operative position across the path of a sheet presented to it from the feed board 20. On the opposite end of the lever 30, are two set screws 32 and 33. The set screw 33 is arranged to engage with a hardened steel stop 34 and the set screw 32 is arranged to engage with a similar stop 35. The stops 34 and 35 form part of a lever 36 pivotally mounted on a fixed center 37 and the lever 36 in turn is connected to the lever 37 by connecting rod 38, the lever 37 being pivotally mounted on the side frame at 39 and carrying a cam roller 40. The cam roller 40 engages with cam 41 attached to the impression cylinder 11.

Each of the tumbler shafts 16 and 17 is provided with the usual tumbler heads 42 and 43 and the side frame is provided with a fixed tumbler pin 44, with which the tumbler heads 42 and 43 engage to close the grippers 14 and 15, and also with the pin 45, with which the tumbler heads engage to open the grippers to release the sheet to the delivery cylinder 46. It will be understood, of course, that the gripper shafts 16 and 17 are provided with the usual spring devices by which the grippers are either held closed or open, according to the position in which they are left after the tumbler heads 42 and 43 pass the pins 44 and 45. Each gripper of the sets 14 and 15 is held to its respective gripper shaft by a set screw, as shown and as ordinarily used. When preparing a new form on the press, the operator will loosen these set screws and adjust the grippers lengthwise on the shafts 16 and 17, according to the sheet to be printed. He then

presses the operative end of each gripper against the gripper abutment and tightens the set screw to hold the gripper. The grippers are slightly elastic or springy and this pressure tends to distort or spring the grippers. After each of the fingers on the shaft is adjusted, the spring of all of the fingers re-acting against the abutment has a tendency to turn the tumbler head slightly from its theoretic position and since the amount of this turning is dependent entirely on the amount of pressure placed on each gripper before it is fastened by the set screw, it will be seen that it is practically impossible to adjust the two sets of grippers 14 and 15 so that the gripper heads 42 and 43 will have exactly the same relation to the cylinder 11 and therefore to the closing pin 44. If, for instance, the slot in the tumbler 42 makes a greater angle with the circumference of the cylinder 11 than does the slot of the tumbler 43, tumbler 42 will leave the fixed tumbler pin 44 sooner than does the tumbler 43 and the grippers 15 will engage a sheet presented to the front gage 21, so that the distance between the point of engagement with the sheet and its front edge will be greater than the corresponding distance between the point of engagement of the grippers 14 and the front edge of the sheet held by them, if such sheets are presented to the cylinder 11 in exactly the same position. It will also be understood that when two or more sets of grippers and impression surfaces are used, as shown in cylinder 11, the grippers and impression surfaces theoretically should be spaced apart so as to divide the cylinder into equal angles. Practically there is always some error in doing this, so that, even without the error due to the springing of the grippers, successive sheets would not be presented to the form cylinders in exactly the same relation unless some means for correcting this error is used. There will also be some error in the gearing connecting the impression cylinder 11 with the form cylinders 18 and 19, which will also tend to disturb the registry of successive sheets. When there is only one impression surface, after the form and impression surfaces are brought to approximately the correct relation, the front gage is adjusted to secure the correct positioning of the sheets with the form. When two or more impression surfaces are used, however, by reason of the before described difference in the closing point of each set of grippers and errors in construction, it becomes impossible to adjust this gage so as to position properly each of a succession of sheets unless some special device is provided to that end. In my novel device in the form which I have illustrated, this may be done by the use of the set screws 32 and 33. It will be seen that, as the impression cylinder 11 ro-

tates, the cams 28 and 29, operating on the roller 27, raise the gage 21 as each of the sets of grippers 14 and 15 pass it and close on the sheet held up against the gage. The
 5 cams 28 and 29 hold the gage 21 out of operative position until the sheet which has just been taken by a set of grippers passes and then the cams 28 and 29 permit the spring 31 to rotate the shaft 22 to bring the
 10 gages back to operative position. This operative position is controlled by the set screws 32 and 33 in connection with the stops 34 and 35. The cam 41, operating on the roller 40, moves the stops 34 and 35 so that
 15 the front gage may have a different operative position for each successive sheet presented to it. With the arrangement described the operator will first position the gage so that the sheet presented to the set of
 20 grippers 15 will have the impression properly placed thereon. This may be done by the adjustment of the set screw 32 bearing against the stop 34 exactly as if the cylinder had only one impression surface. The cylinder 11 is then turned around until the set of
 25 grippers 14 engages with the sheet presented to the gage 21, at which time the set screw 32 is over the stop 35. Without disturbing in any way the previous setting of the gage, the set screw 32 is now manipulated until
 30 the gage is properly positioned so that sheets taken by the set of grippers 14 will have the impressions from cylinders 18 and 19 printed in exactly the same relation to the margins of the sheet as is the case of
 35 the sheets presented to the grippers 15. It is obvious that, by reason of the fact that the set screws 32 and 33 engage alternately with the stops 34 and 35, respectively, and
 40 that the position of the front gage will remain exactly the same for all sheets taken by the set of grippers 15 and exactly the same for all of the sheets taken by the grippers 14, all of the sheets taken in succession
 45 from the feed board 20 may be printed in the same register. Hence if these sheets are passed through the press the second time, it will be wholly immaterial whether a sheet originally presented to gripper 15, for instance,
 50 is presented to the set of grippers 15 or to the set of grippers 14.

In the device described, I have provided a mechanism by which, irrespective of the closing points of a plurality of sets of
 55 grippers, I may present sheets to a printing surface with all of said sheets in the same relation with that surface and I also provide a mechanism by which each of a plurality of impression surfaces in an impression cylinder and the grippers connected therewith becomes, so far as the gaging and taking of sheets are concerned, the same as if each of these impression surfaces constituted an individual and separate impression
 65 cylinder.

While I have shown devices for shifting the front gage to a predetermined position for each of a succession of sheets presented to it in order to control the distance between the engaging point of the grippers and the front edge of each sheet, my invention is by
 70 no means limited to this specific structure. There are various ways in which the point of engagement of each of the sheet-taking devices with a sheet presented to it may be determined without affecting the point of engagement of any other of the devices. This
 75 may be done, for instance, by shifting the position of the tumbler pin 44 between the successive closings of the different sets of grippers, which can be done by substantially the same cam and connections which I have shown to position the front gage 21, or it
 80 can be accomplished by having the tumbler heads 42 and 43 at opposite ends of impression cylinder 11 and a pin on each of the side frames to engage with each of these
 85 tumbler heads, each of these pins being separately adjustable. Either of these last named arrangements would be particularly
 90 useful in a press in which a feed cylinder, having a single set of grippers, fed sheets to an impression cylinder having a plurality of sets of grippers. It should also be understood that while I have shown my invention
 95 in connection with an impression cylinder having a plurality of surfaces, it may also be used in connection with any other form of cylinder, such as a feed cylinder, or in fact with any form of sheet carrier having
 100 a plurality of sheet taking devices thereon, all of which operate at substantially the same point in the travel of the carrier.

It is sometimes desirable to permit the feeding of a sheet to only one of the sets of
 105 grippers 14 and 15 at each rotation of the cylinder 11. This may be done by preventing the front gage 21 from coming into operative position for the set of grippers which are not to be used. The operator will
 110 then not be able to present a sheet to such set of grippers. For instance, if it is desired to present sheets only to the set of grippers 15, the front gage 21 would be moved out of position as usual after the
 115 front edge of the sheet has been taken by the grippers 15 and held in such position by the cam 28 until the end of that impression surface is passed. Now if instead of allowing it to drop into operative position
 120 in order to position a sheet for the grippers 14, the gage be held out of operative position until the grippers 14 have passed the feeding point and it is then allowed to drop, the operator can position a sheet against the
 125 gage at such times as will permit it to be taken by the grippers 15. As a convenient means for accomplishing this end, I provide the impression cylinder 11 with a second cam 47, which, as will be seen by reference 130

to Fig. 2, lies nearer the cylinder 11 than do the cams 28 and 29. This cam, 47 is formed conveniently on the same circular bar which forms cam 28, the portion 47 being one-half the width of the portion 28, and being next to the cylinder 11. Obviously, instead of being formed as one piece, these two cams could be formed of two pieces fastened together. The circular portion of the cam 47 is continued past the end of the impression surface 12 and the grippers 14 and then discontinued. It will be seen that if the roller 27 is made to engage with the cam 47, the latter will raise the gage 21 in order to clear the sheet taken by the grippers 15 and will hold it out of operative position until after the grippers 14 have passed the feeding point, the roller 27 passing over cam 47 and the circular portion of cam 29. When the roller 27 reaches the end of cam 29, the gage will be allowed to drop into operative position and remain so until the grippers 15 again take a sheet. If more time is required in which to position the sheet, the circular portion of cam 29 may be cut away adjacent the cylinder, to allow roller 27 to drop sooner. As a convenient means to enable me to shift the roller 27 from the cam 28 to the cam 47, I make the roller 27 removable from the stud on which it rotates in the end of the lever 26 so that it may be placed in either the position of Fig. 2 or of Fig. 3. When it is in the position shown in Fig. 3, the roller 27 engages with the cams 28 and 29 to operate the gage 21 for each set of grippers and when it is in position shown in Fig. 2, the gage 21 operates only for the set of grippers 15.

It is obvious that means other than the specific mechanism that I have shown may be used to prevent the operation of the gage 21 for each successive set of grippers in the cylinder 11 and that my invention is applicable to a cylinder having any number of impression surfaces and I therefore do not wish to be limited to the specific device which I have used for the purposes of illustration.

Having now described my invention, what I claim is:

1. A movable member having a plurality of sets of sheet taking devices thereon, means to engage said devices in succession with sheets presented at a portion of the path of said devices and means whereby the point of engagement of each of said sets of devices with a sheet may be determined independently of the point of engagement of any other of said devices with a sheet.
2. A movable member having a plurality of sets of sheet grippers thereon, means to close each of said sets as it passes a predetermined portion of the path of said sets and means to determine the closing point of each said set in relation to the sheet gripped

thereby, independently of the closing point of any one of the remaining said sets in relation to the sheet gripped thereby.

3. A rotatable cylinder having a plurality of sets of sheet grippers therein, means to close each of said sets as it is carried past the feeding point of said cylinder and means to determine the closing point of each said set in relation to the sheet gripped thereby, independently of the closing point of any one of the remaining said sets in relation to the sheet gripped thereby.

4. A cylinder having a plurality of sets of grippers therein, a sheet support at the feeding point of said cylinder, mechanism to close said grippers in succession at said feeding point to take sheets in succession from said support and mechanism constructed and arranged to control the distance between the point of engagement of one set of grippers and the front edge of the sheet gripped thereby, independently of the corresponding distance between the point of engagement of any other of said set of grippers and the front edge of the sheet gripped thereby.

5. A cylinder having a plurality of sets of sheet taking devices therein, a sheet support, mechanism to operate said device to take sheets in succession from said support and mechanism constructed and arranged to control the distance between the point of engagement of any one of said devices and the front edge of a sheet engaged thereby, independently of the corresponding distance between the point of engagement of any other of said devices and the front edge of the sheet engaged thereby.

6. A cylinder having a plurality of sheet bearing surfaces, a sheet support at the feeding point of said cylinder, sheet taking devices in said cylinder constructed and arranged to take sheets in succession from said support and attach them temporarily in predetermined positions to said surface and means whereby the predetermined position of sheets so attached to any one of said surfaces may be altered without affecting the predetermined positions of sheets on the remaining surfaces.

7. A cylinder having a plurality of sheet bearing surfaces, a sheet support at the feeding point of said cylinder, a set of sheet grippers for each said surface in said cylinder, mechanism to close said grippers in succession at said feeding point to take sheets in succession from said support and attach them temporarily to said surfaces and means whereby the sheets so attached to any one of said surfaces may be positioned in a predetermined relation thereto, independently of the predetermined relation between any other such surface and the sheets so attached thereto.

8. A movable member having a plurality

of sets of sheet taking devices therein, a front sheet gage and means whereby the operative position of said gage may be automatically altered between the successive engaging operations of said devices.

9. A movable member having a plurality of sets of sheet grippers thereon, a front sheet gage, means to close each of said sets of grippers as it arrives at said gage and means whereby the operative position of said gage may be automatically altered between the successive closings of said sets.

10. A movable member having a plurality of sets of sheet taking devices therein, means to engage said devices in succession with sheets presented at a portion of the path of said devices, a front sheet gage, and means whereby the operative position of said gage may be automatically altered between the successive engaging operations of said devices.

11. A cylinder having a plurality of sets of sheet grippers therein, a sheet support adjacent said cylinder, a sheet gage constructed and arranged to determine the position of a sheet on said support in relation to said cylinder, means to close said sets in succession to take sheets from said support and means whereby the operative position of said gage may be automatically altered between the taking of successive sheets.

12. A cylinder having a plurality of sets of sheet grippers therein, a sheet front gage, means to close each of said sets as it passes said gage and means to alter the distance between the operative position of said gage and the closing point of one of said sets of grippers independently of the corresponding distance between the said gage and the closing point of any other of said sets.

13. A cylinder having a plurality of sets of sheet grippers therein, a sheet front gage, means to close each of said sets as it passes said gage, a stop constructed and arranged to determine the operative position of said gage, and means to change automatically the operative position of said stop after each of said sets of grippers passes said gage.

14. A cylinder having a plurality of sets of sheet grippers therein, a sheet front gage, means to close each of said sets as it passes said gage and means whereby the operative position of said gage may be automatically changed before each of said sets of grippers close.

15. A cylinder having a plurality of sets of sheet grippers therein, a sheet front gage, means to close said sets in succession on sheets presented to said gage and means whereby said gage may be moved automatically to a succession of predetermined operative positions.

16. A cylinder having a plurality of sets of sheet grippers therein, a sheet front gage, means to close each of said sets in succession

on sheets presented to said gage, means to raise said gage to permit a sheet to pass, a stop arranged to determine the operative position of said gage when lowered and means to shift the position of said stop automatically after each sheet is taken, whereby said gage may be held in different predetermined operative positions for successive sheets.

17. A cylinder having a plurality of sets of sheet grippers therein, a sheet front gage, means to close each of said sets as it passes said gage and adjustable means for permitting the feeding of a sheet to each set of grippers as it passes said gage or to each alternate set.

18. A cylinder having a plurality of sets of sheet grippers therein, means to close each of said sets at the feeding point of said cylinder, a sheet front gage, and means whereby said gage may be held out of operative position until one of said sets has passed said gage.

19. A cylinder having a plurality of sets of sheet taking devices therein, a sheet front gage, means to engage each of said sets with a sheet presented to said gage when it is in operative position and means whereby said gage may be held out of operative position while a predetermined set of said devices is passing said gage.

20. A cylinder having a plurality of sets of sheet taking devices therein, a sheet front gage, means to engage each of said sets with a sheet presented to said gage when it is in operative position, means to raise said gage to allow the sheets to pass, means to lower said gage after the passage of each sheet and means whereby the lowering of said gage may be prevented at predetermined intervals.

21. A cylinder having a plurality of sets of sheet grippers therein, a sheet front gage, means to close said sets of grippers in succession as they pass said gage, means to move said gage into operative position prior to the passing of said gage by each of said sets and means whereby said gage may be withheld from operative position while a predetermined set of grippers is passing said gage.

22. A cylinder having a plurality of sets of sheet grippers therein, a sheet front gage, means to close each of said sets of grippers as it passes said gage, a cam constructed and arranged to operate said gage to move it out of operative position prior to the passing of each of said sets and a second cam constructed and arranged to hold said gage out of said operative position during the passing of a predetermined set of grippers.

23. A cylinder having a plurality of sets of sheet grippers therein, a sheet front gage, means to close each of said sets as it passes said gage, a cam roller, connections between said cam rollers and said gage, a cam con-

5 structed and arranged to operate on said roller to permit said gage to be moved into operative position prior to the passing of each of said sets of grippers and a second cam constructed and arranged to operate on
10 said cam roller to permit said gage to be moved into operative position prior to the passing of each alternate set of said grippers, said cam roller and connections being
15 so constructed and arranged that said rollers may be made to engage with either of said cams.

24. A sheet carrier, means by which sheets may be supported and presented in succession to said carrier, a sheet front gage and automatic means adapted to move said gage successively to different predetermined operative positions between the presentation of the sheets to said sheet carrier.

20 25. A sheet carrier having sheet-taking means thereon, a sheet front gage and means whereby the operative position of said gage may be automatically altered between the successive operations of said sheet-taking
25 means.

26. A sheet gage, means to move said gage out of gaging position, means to return it to gaging position, and means to control said gage as it returns to gaging position to locate said gage successively in each of a series of predetermined different gaging positions. 30

27. A sheet front gage, automatic means adapted to move said gage successively to each of a series of predetermined different gaging positions, and means to move said gage out of gaging position after each such positioning. 35

28. A sheet carrier having sheet-taking means thereon, a sheet front gage, means to operate said sheet-taking means to engage a sheet and automatic means adapted to change the distance between the gaging position of said gage and the sheet engaging point of said sheet-taking means for each sheet-taking operation thereof. 40 45

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