

**No. 705,181.**

Patented July 22, 1902.

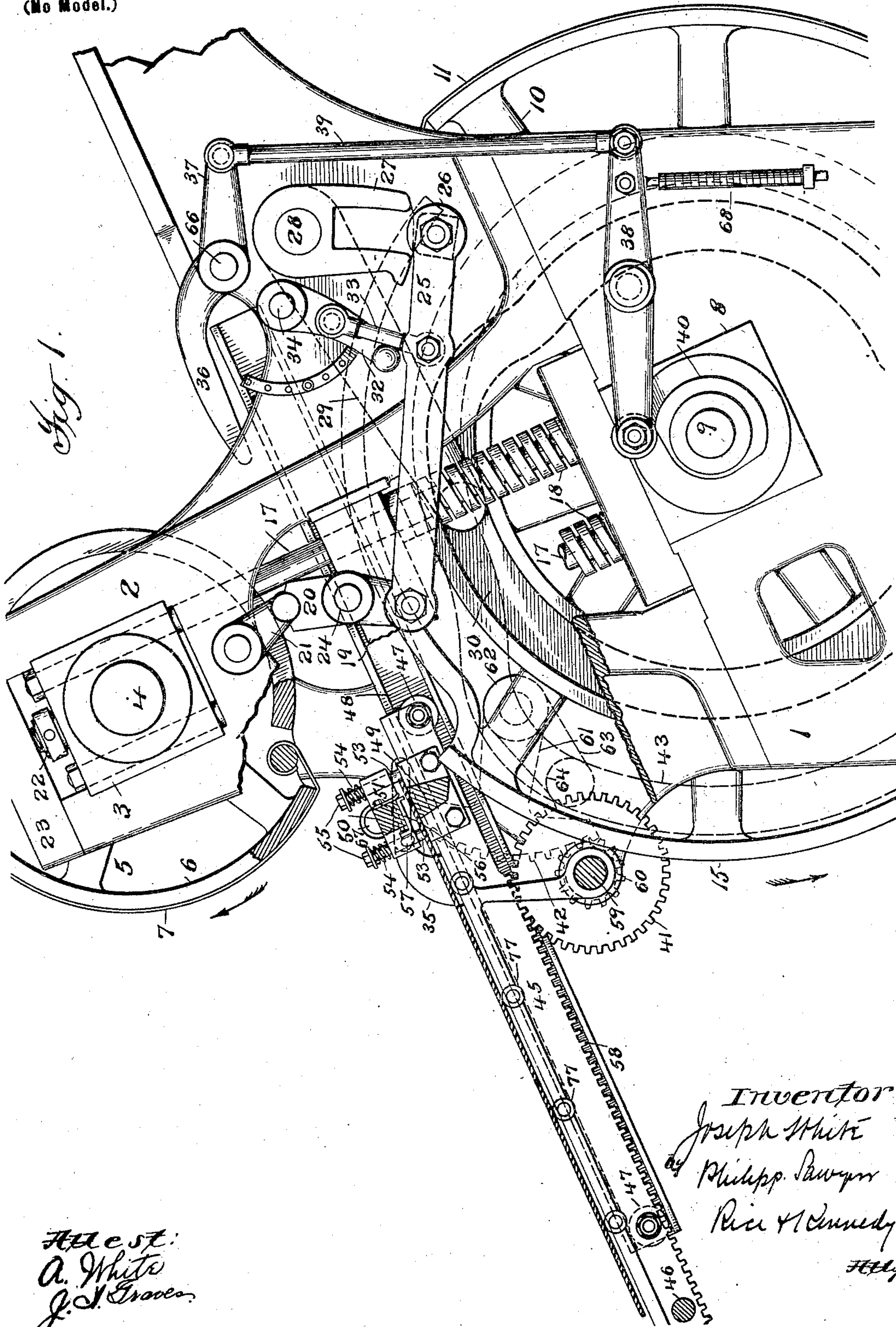
**J. WHITE.**

# FEEDING MECHANISM FOR PRINTING MACHINES.

(Application filed Sept. 26, 1901.)

4 Sheets—Sheet 1

(No Model.)



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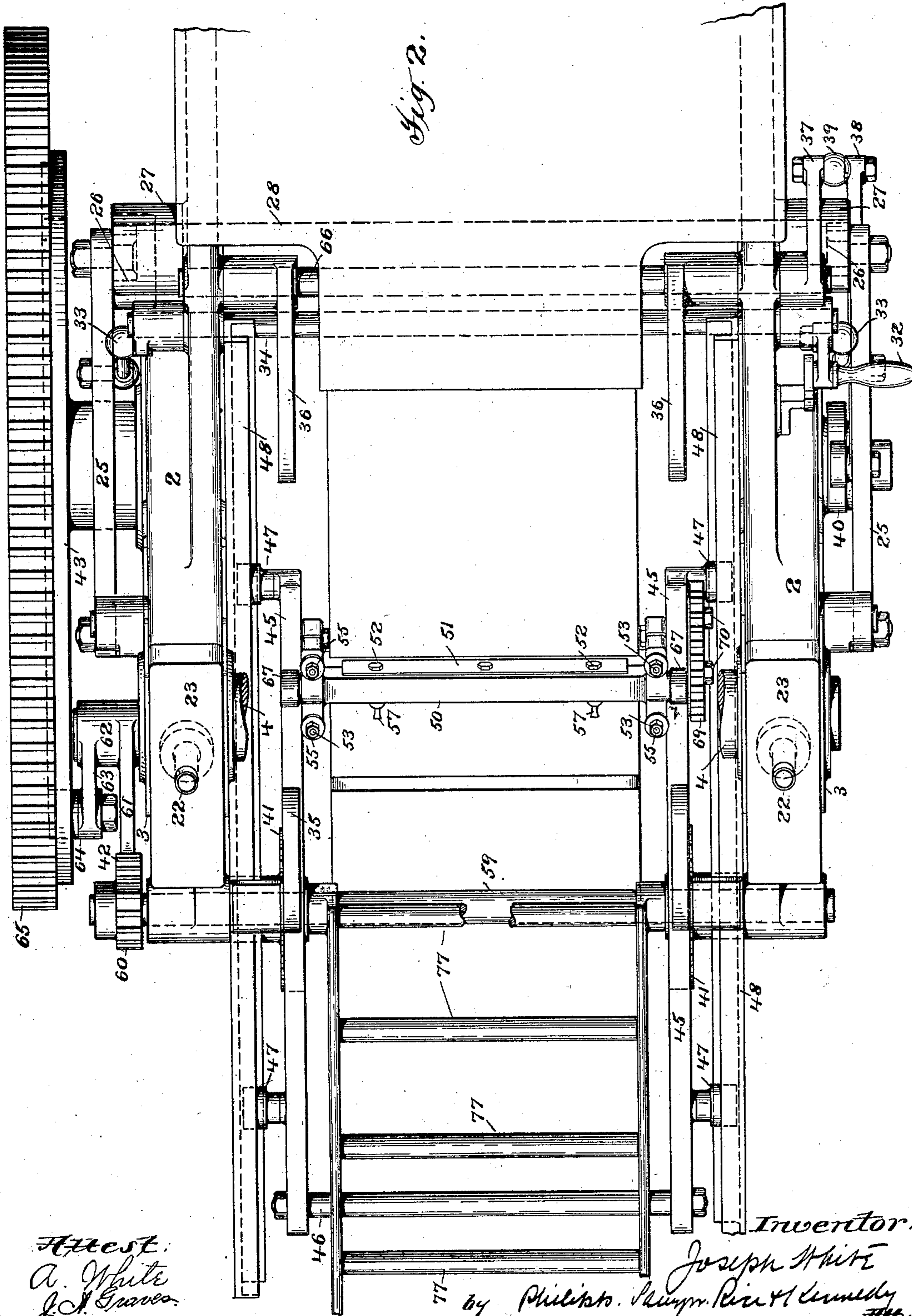
J. WHITE.

FEEDING MECHANISM FOR PRINTING MACHINES.

(Application filed Sept. 26, 1901.)

(No Model.)

4 Sheets—Sheet 2.



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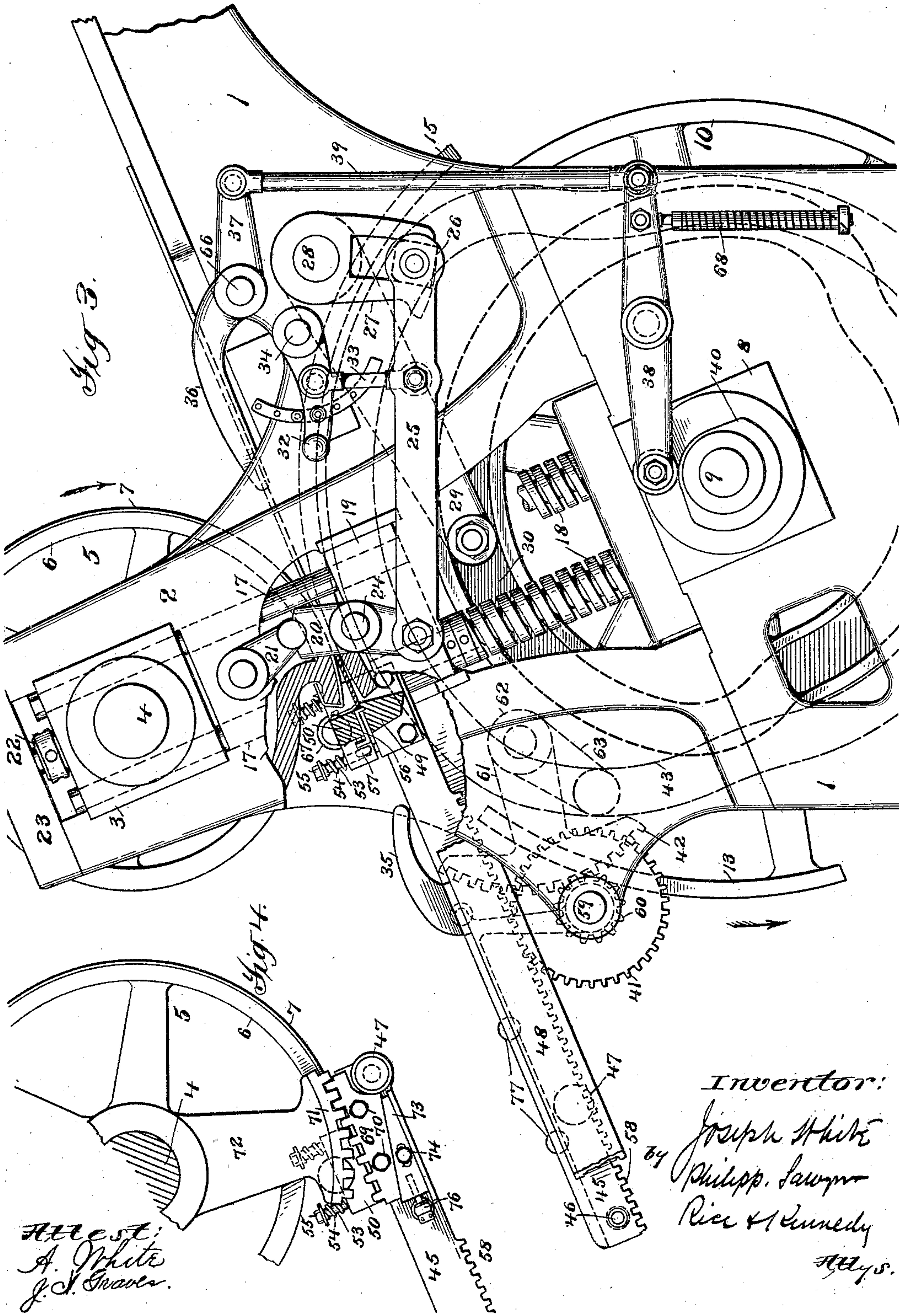
J. WHITE.

FEEDING MECHANISM FOR PRINTING MACHINES.

(Application filed Sept. 26, 1901.)

(No Model.)

4 Sheets—Sheet 3.



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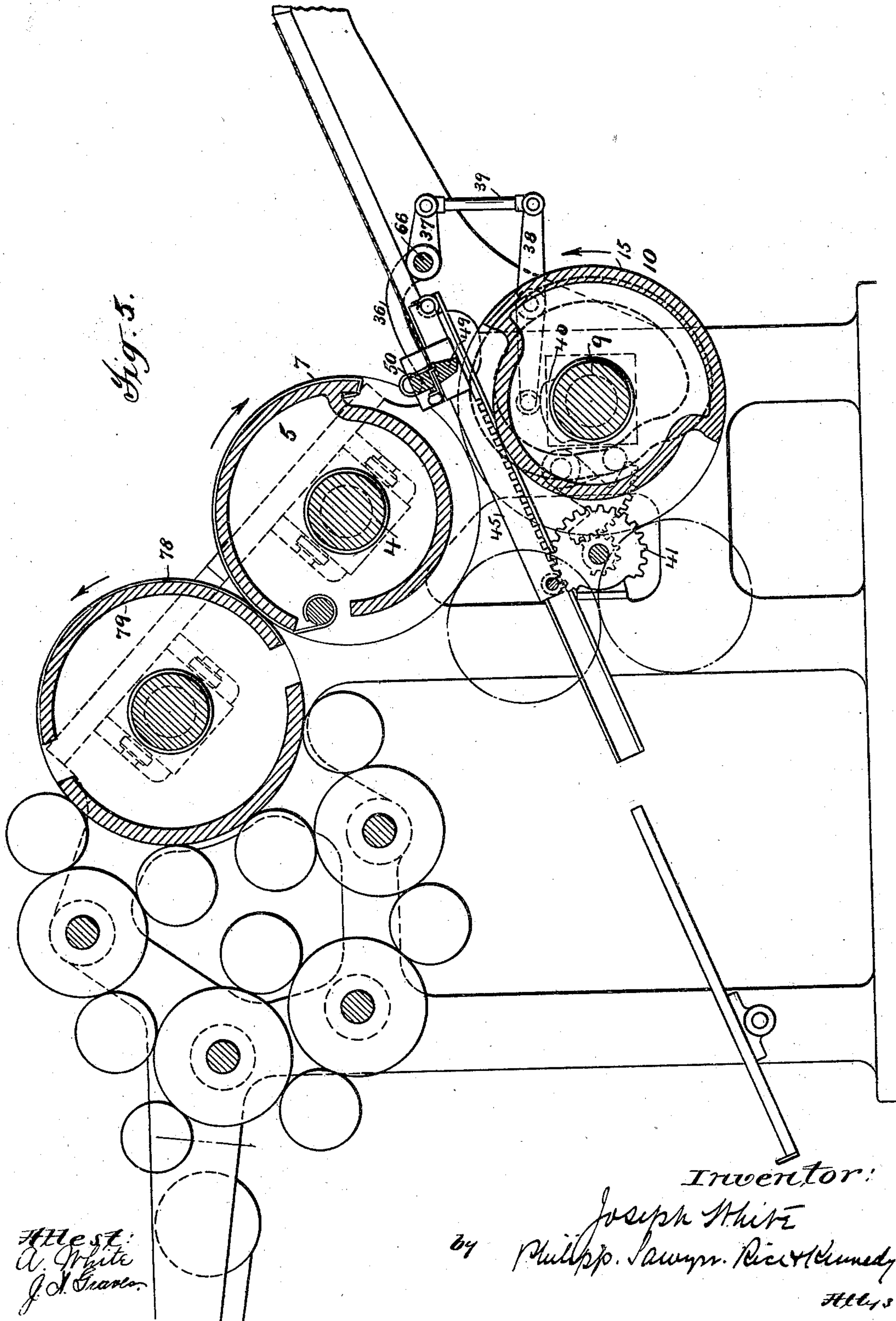
J. WHITE.

FEEDING MECHANISM FOR PRINTING MACHINES.

(Application filed Sept. 26, 1901.)

4 Sheets—Sheet 4.

(No Model.)





# UNITED STATES PATENT OFFICE.

JOSEPH WHITE, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE, OF  
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## FEEDING MECHANISM FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 705,181, dated July 22, 1902.

Application filed September 26, 1901. Serial No. 76,599. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH WHITE, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Feeding Mechanism for Printing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part  
10 of the same.

This invention relates to certain improvements in feeding mechanisms for printing-machines, and has for its object to produce an improved feeding mechanism by which a  
15 sheet may be taken and accurately presented to the printing-couple, said mechanism reciprocating from one side of the couple to the other, so as to take a sheet and introduce it into the bite of the cylinders, the sheet being  
20 held by said mechanism until it has been nipped between the cylinders.

With this and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter fully described and then specifically pointed out in the claims  
25 hereunto appended.

In the accompanying drawings, in which like characters of reference indicate the same  
30 parts, Figure 1 is a side elevation, partly in section, of so much of a printing-machine as is necessary to an understanding of the invention. Fig. 2 is a plan view of the construction shown in Fig. 1, the cylinders being  
35 removed. Fig. 3 is a side elevation similar to Fig. 1, showing the parts in a different position. Fig. 4 is a detail view illustrating the registering mechanism. Fig. 5 is a sectional side elevation of a different form of printing  
40 mechanism having the improved feeding mechanism applied thereto.

Referring to the drawings, 1 indicates the frame of the machine, which may be of any usual or desired construction. This frame  
45 is or may be provided with uprights or standards 2, which when the printing member of the printing-couple is cylindrical in form may serve to support the boxes 3, in which the shaft 4, which supports said member, is mounted.

50 While the invention may be used with any form of printing-couple, in the construction

shown the printing-couple consists of two cylinders, the printing-cylinder, which is marked 5, being provided with the usual bed 6, on which is mounted a transfer printing-surface of any desired material—as, for instance, rubber cloth—said surface being  
55 marked 7. This bed extends only part way around the cylinder 5, a cut-away portion being thus provided on the cylinder, the purpose of which will be hereinafter stated. The  
60 frame 1 also supports boxes 8, in which the shaft 9 of the lower cylinder 10 of the couple is supported. In the form of the machine which has been selected to illustrate the invention the cylinder 10 is provided with an  
65 ink-applying surface 11, which is or may be in the form of an aluminium plate, on which a suitable design is placed. The cylinder 10 is further provided with an impression-surface 15, which may be of any desired character. The impression and ink-applying surfaces are spaced from each other and the cylinder 5 makes two revolutions to one of the  
70 cylinder 10, so that the ink-applying surface first comes in contact with the printing-surface on the cylinder 5 on one revolution of the cylinder and on the next revolution of the cylinder the printing-surface 7 and the  
75 impression-surface 15 come into coöperative relation. The printing and impression surfaces are spaced from each other, as has been stated, thus providing cut-away portions which have a special function to be hereinafter referred to.  
80

Any suitable inking apparatus may be employed—as, for instance, inking-rollers; but as this mechanism has no relation to the present invention it has not been illustrated, with the exception that an ink-table 13, with which  
85 the rolls may coöperate, is shown.

The particular machine which has been selected to illustrate the invention is designed to print on metal or other material having greater thickness than paper, and it is desirable, therefore, to provide means by which  
90 the members of the couple may be separated somewhat in order to allow the thick material to be introduced between them. In the construction shown this is effected by means of  
95 rods 17 and springs 18, these rods and springs being controlled by toggles 20 21, the mem-



bers 20 of the toggles being supported on blocks 19 and the members 21 being secured to the standards 2. The amount of separation between the cylinders produced by the toggles is controlled by means of set-screws 22, threaded into the cylinder-caps 23. The members 20 of the toggles are mounted on short shafts 24, which are controlled by bars 25, said bars carrying studs 26, which engage grooves in swinging arms 27, mounted on a shaft 28, extending across the machine. The shaft 28 is operated by an arm 29, carrying a bowl, which engages a path-cam 30, mounted on the shaft 9 of the cylinder 10. The lifting mechanism is thrown into and out of operation by means of a handle 32, which is connected by a link 33 to one of the bars 25, said handle being mounted on a shaft 34, which extends across the machine and is suitably connected to the bar 25, which is located on the opposite side and which controls the toggle on that side.

The machine so far described forms the subject-matter of my companion application filed of even date herewith and serially numbered 76,600. A further description of it in this application is not, therefore, deemed necessary, reference being made to the other application for a full disclosure of its construction and the novel features which it embodies, said features being claimed therein. While, furthermore, this machine affords a convenient means for illustrating the operation of the feeding mechanism which forms the subject-matter of the present application and while said mechanism as to some of its features is specifically applicable to this machine, it is to be understood that the feeding mechanism is not confined in its use to this machine or to machines of this class, but that it may be used in connection with machines varying widely from the one which has been described both in construction and principle of operation.

The feeding mechanism may be varied widely in construction. It embodies, however, a carriage which, as shown, is formed of a pair of side bars 45, which are connected by a cross-bar 46, although it may be otherwise constructed, if desired. The bars 45 are or may be provided with rollers 47, which engage a track consisting of grooved bars 48, suitably mounted on the standards 2 of the machine-frame. This carriage is provided with a gripper mechanism which may be of any suitable form and construction. As shown, this gripper mechanism embodies a stationary under jaw, consisting of a bar 49, extending between and secured to the side bars 45. The member which coöperates with this stationary bar 49, as shown, consists of a bar 50, carrying a jaw 51, which is or may be secured to the bar 50 by means of screws 52. In the construction shown the bar 50 is movably mounted with relation to the bar 49, so that the gripper may be opened and closed. The connection between the two bars, which

allows them to be relatively movable, may be of any desired construction. As shown, the bar 49 is provided with four upright posts 53, which pass through perforations in the bar 50. These posts are surrounded by springs 54, which bear against nuts 55 on the posts and against the bar 50. It is apparent that the bar 50 may thus be raised against the tension of the springs to open the gripper by suitable mechanism. The carriage is also provided with stopping devices the function of which is to determine the position of the sheet at the time when it is seized by the gripper. These stopping devices may be of any suitable description. As shown, they comprise angle-pieces 56, which are preferably adjustably secured to the bar 50 by means of thumb-screws 57 or in any other suitable manner. The front downwardly-bent ends of these angle-pieces are so positioned that the edge of the sheet may be pushed against them as the sheet is fed, the sheet being thereby stopped in any desired position and at any desired point, according to the adjustment of the angle-pieces.

The carriage is preferably arranged to reciprocate from one side of the couple to the other, any desired means being employed to effect the reciprocation. In the construction shown, however, each of the side bars 45 is formed to provide a rack 58, these racks being engaged by pinions 41, which are suitably mounted on a short shaft 59, journaled in the side frame. This shaft is provided with a pinion 60, which is engaged by a segment-rack 42, carried by an arm 61, mounted on a hub 62, which is mounted on a stud extending out from the frame of the machine, as is clearly shown in Fig. 2. The hub 62 has extending from it an arm 63, which carries a bowl 64, said bowl engaging in a path-cam 43, which is secured to the shaft 9, on which one of the main driving-gears 65 is mounted. As this shaft 9 rotates, therefore, the cam will cause the hub 62 to be rocked on its stud and the segment-rack 42, operating through the pinion 60, will cause the pinions 41 to receive a rotary reciprocating motion, thus producing the backward and forward reciprocation of the carriage. The cam 43 is so shaped as to cause the carriage to be given a dwell at the end of its backward reciprocation while it is at the sheet-taking point, this dwell giving time for the sheet to be accurately adjusted against the stopping devices and in the bite of the gripper-jaws.

Means are provided for opening and closing the gripping devices at the sheet-taking point. These means may be varied widely in construction; but, as shown, two arms 36 are provided for this purpose, these arms being mounted on a shaft 66, which extends across the machine beneath the feed-board. These arms 36 are arranged to be engaged by rollers 67, which are mounted on the bar 50. In the form of the construction shown the arms 36 are slightly cam-shaped on their operating-



faces and are so positioned that the rollers strike them as the carriage is completing its backward movement, the gripper-jaws being thus opened as the carriage comes to a stop.

5 In the construction shown the arms are moved after the sheet is placed in position, so as to allow the gripper-jaws to close; but it is obvious that the arms might be rocked so as to open the gripper-jaws after the carriage has  
10 completed its backward movement.

The means for operating the arms 36 may be of any suitable character. As shown, the shaft 66 has extending from it an arm 37, which is connected by means of a link 39 to an  
15 arm 38 pivoted on the machine-frame. This arm 38 carries a bowl which engages a cam 40, mounted on the shaft 9, and, further, has connected to it an ordinary spring-rod 68. The cam 40 is so proportioned as to rock the  
20 shaft 66 at the proper time to allow the gripper-bar 50 to be forced downward by its springs 54 to close the gripper.

Means are provided for opening the gripper-bars at the sheet-releasing point, which  
25 will preferably be located a short distance beyond the printing-couple, since the couple itself can be depended upon to forward the sheets of metal or other thick material upon which the present machine is designed to  
30 print. The sheet will be released by the gripper-bars. Therefore, before it has completed its forward movement and in order to be completely printed it passes onward through the grippers. The means by which the gripper-  
35 bars are opened at the sheet-releasing point may be of any suitable character. As shown, however, two stationary cams 35 are provided for this purpose, these cams 35 coöperating with the rollers 67 before referred to. These  
40 cams, it will be seen, are located only a short distance from the couple and come into operation soon after the gripper-bars clear the couple. This construction not only provides for an efficient delivery of the sheet, but also  
45 shortens the amount of travel which it is necessary to give the carriage and is therefore very advantageous.

Inasmuch as the sheet is entirely under the control of the gripper mechanism until the  
50 cylinders have begun to print upon it, it is desirable to provide a registering mechanism which is additional to the mechanism for reciprocating the carriage and which insures that the sheet be presented to the printing-  
55 surface of the printing-cylinder with desired accuracy. This registering mechanism may be variously constructed. As shown, however, the carriage (see Fig. 4) is provided with a short rack 69, which is adjustably secured to one of  
60 the bars 45 of the carriage by means of screws 70, passing through slots in the rack, or in any other convenient manner. This rack 69 is engaged by a segment-rack 71, carried on an arm 72, secured to the cylinder 5 or its  
65 shaft. Inasmuch as the cylinder 5 is arranged to be adjusted toward and away from the companion member of the couple in order to

provide for printing upon material of different thickness, it is desirable that the registering mechanism be also made adjustable, 70 so that it may be shifted to correspond with the position of the cylinder. This adjustment of the registering mechanism may be effected in any desired manner. As shown, however, the rack 69 has an inclined face 75 which engages with the inclined face of a wedge 73, secured to one of the bars 45 by means of a bolt 74, which passes through a slot in said wedge or in any other convenient manner. The position of the wedge is shifted 80 by means of a screw 76. As the cylinder 5 is moved toward and away from its companion cylinder therefore the position of this registering-rack can be similarly altered and the position of the carriage and the sheet under 85 its control be accurately determined at the time when the printing operation begins.

It has been heretofore stated that both members of the couple are preferably provided with cut-away portions, the cylinder 5 in the 90 construction shown being cut away except for its printing-surface and the cylinder 10 having the ink-applying surface spaced from the impression-surface, thus providing cut-away or open portions. The purpose of these 95 cut-away portions is to permit the carriage to pass between the cylinders on its backward movement or the movement which it makes to receive the sheet and also to pass between the cylinders on its forward movement, by 100 which movement it brings the sheet into position to receive the impression. In Fig. 1 the gripper-jaws are shown as open and the sheet of metal or other material being printed upon as having passed nearly through them 105 and moving down a bed of rollers 77, arranged to receive it. In this figure the carriage is just beginning its return movement, and the direction of movement of the cylinders is indicated by the arrows. It will be seen, there- 110 fore, that the cut-away or open spaces of the cylinders come opposite each other, thus allowing the carriage plenty of room to make its backward reciprocation. In Fig. 3 the cylinders are shown as in printing position, 115 the gripper-bars having passed between them and still holding the sheet. From the position shown in this figure the gripper-bars continue their movement until they strike the cams 35, when they are opened, after which 120 the sheet is allowed to pass between them, being drawn forward by the cylinders. It will be noted that the carriage is arranged to run in a plane at an angle to the horizontal. This construction not only facilitates the feed- 125 ing of the sheet of metal or other material to be printed to the grippers, but also enables the action of gravity to assist in the delivery of the sheets from the gripper-bars after they have been released by the printing-cylinders. 130

In the construction shown in Fig. 5 the feeding mechanism is substantially the same in all respects as that which has been heretofore described; but it is shown as applied



to a machine of a somewhat different type, although this machine is also intended for printing on sheet material other than paper—as, for instance, sheet metal. In the machine shown in Fig. 5 the printing is accomplished by a transfer-surface 7, as before, mounted on the cylinder 5; but the ink or design is applied to this surface by means of an ink-applying or design surface 78, carried on a cylinder 79, the ink being applied to this surface by means of a group of inking-rollers of a usual construction. The cylinder 10 in this machine is therefore supplied with an impression-surface only. The impression-surface of the cylinder 10 and the transfer-surface on the cylinder 5 are, however, cut away, as shown, so as to allow space for the gripper-bars to pass between these cylinders.

While the feeding mechanism is particularly adapted for handling sheets of comparatively heavy material, such as tin or other sheet metal, it is to be understood that it may be used for other purposes. While, furthermore, the mechanism in which the invention is embodied is an effective one, it is to be understood that many changes and variations may be made therein without departing from the invention. The invention is not, therefore, to be confined to the specific mechanism hereinbefore described nor to the specific use described.

What I claim is—

1. The combination with a printing-couple, of a carriage, sheet-holding devices mounted thereon said devices including a bar extending across the carriage and having its operating-face substantially flat so that a sheet may be slid into position thereon, cooperating gripping means, gripper-operating means, said means including devices for operating the grippers while the carriage is at rest, and means for giving the carriage a reciprocating movement from one side of the couple to the other, substantially as described.

2. The combination with a continuously-rotating couple, of a carriage, sheet-holding devices mounted thereon said devices including a bar extending across the carriage and having its operating-face substantially flat so that a sheet may be slid into position thereon, cooperating gripping means, gripper-operating means, said means including devices for operating the grippers while the carriage is at rest, and means for giving the carriage a reciprocating movement from one side of the couple to the other, substantially as described.

3. The combination with a printing-couple one or both members of which have portions cut away, of a carriage, sheet-holding devices mounted thereon said devices including a bar extending across the carriage and having its operating-face substantially flat so that a sheet may be slid into position thereon, cooperating gripping means, gripper-operating means, said means including devices for operating the grippers while the carriage is at rest, and means for giving the carriage a re-

ciprocating movement from one side of the couple to the other, substantially as described.

4. The combination with a continuously-rotating printing-couple one or both members of which have portions cut away, of a carriage, sheet-holding devices mounted thereon said devices including a bar extending across the carriage and having its operating-face substantially flat so that a sheet may be slid into position thereon, cooperating gripping means, gripper-operating means, said means including devices for operating the grippers while the carriage is at rest, and means for giving the carriage a reciprocating movement from one side of the couple to the other, substantially as described.

5. In a printing-machine, the combination with a printing-couple comprising a member arranged to carry a transfer printing-surface and a cooperating member arranged to carry a surface from which the transfer-surface receives its printing medium and an impression-surface, of a carriage, sheet-holding devices mounted thereon, and means for giving the carriage a reciprocating movement from one side of the couple to the other, substantially as described.

6. In a printing-machine, the combination with a continuously-rotating printing-couple comprising a member arranged to carry a transfer printing-surface and a cooperating member arranged to carry a surface from which the transfer-surface receives its printing medium and an impression-surface, of a carriage, sheet-holding devices mounted thereon, and means for giving the carriage a reciprocating movement from one side of the couple to the other, substantially as described.

7. In a printing-machine, the combination with a printing-couple comprising a member arranged to carry a transfer printing-surface and a cooperating member arranged to carry a surface from which the transfer-surface receives its printing medium and an impression-surface, one or both members of the printing-couples having portions cut away, of a carriage, sheet-holding devices mounted thereon, and means for giving the carriage a reciprocating movement from one side of the couple to the other, substantially as described.

8. In a printing-machine, the combination with a continuously-rotating printing-couple comprising a member arranged to carry a transfer printing-surface and a cooperating member arranged to carry a surface from which the transfer-surface receives its printing medium and an impression-surface, one or both members of the printing-couples having portions cut away, of a carriage, sheet-holding devices mounted thereon, and means for giving the carriage a reciprocating movement from one side of the couple to the other, substantially as described.

9. The combination with a printing-couple, of a carriage, gripping devices mounted on the carriage, means for opening and closing the gripping devices at the sheet-taking point,



means for reciprocating the carriage to cause the sheet to pass between the members of the couple, and means for stopping the carriage and opening the gripping devices before the sheet has completed its forward movement whereby the sheet is allowed to pass onward between the members of the grippers, substantially as described.

10. The combination with a printing-couple, of a carriage, gripping devices mounted on the carriage, means for opening and closing the gripping devices at the sheet-taking point, means for reciprocating the carriage to cause the sheet to pass between the members of the couple and means for stopping the carriage and opening the gripping devices before the sheet is released by the printing-couple, substantially as described.

11. The combination with a continuously-rotating printing-couple, of a carriage, gripping devices mounted on the carriage, means for opening and closing the gripping devices at the sheet-taking point, means for reciprocating the carriage to cause the sheet to pass between the members of the couple, and means for stopping the carriage and opening the gripping devices before the sheet has completed its forward movement whereby the sheet is allowed to pass onward between the members of the grippers, substantially as described.

12. The combination with a continuously-rotating printing-couple, of a carriage, gripping devices mounted on the carriage, means for opening and closing the gripping devices at the sheet-taking point, means for reciprocating the carriage to cause the sheet to pass between the members of the couple, and means for stopping the carriage and opening the gripping devices before the sheet is released by the printing-couple, substantially as described.

13. The combination with a printing-couple, of a carriage, gripping devices, and sheet-stopping devices mounted on the carriage, and means for reciprocating the carriage from one side of the couple to the other to cause the sheet to pass between the members of the couple, substantially as described.

14. The combination with a printing-couple, of a carriage, gripping devices and sheet-stopping devices mounted on the carriage, and means for reciprocating the carriage from one side of the couple to the other in a plane at an angle to the horizontal, substantially as described.

15. The combination with a printing-couple, one or both members of the couple having portions cut away, of a carriage, gripping devices and sheet-stopping devices mounted on the carriage, and means for reciprocating the carriage from one side of the couple to the other to cause the sheet to pass between the members of the couple, substantially as described.

16. The combination with a printing-couple one or both members of the couple hav-

ing portions cut away, of a carriage, gripping devices and sheet-stopping devices mounted on the carriage, and means for reciprocating the carriage from one side of the couple to the other in a plane at an angle to the horizontal, substantially as described.

17. The combination with a printing-couple, of a carriage, gripping devices mounted thereon, means for reciprocating the carriage at an angle to the horizontal and from one side of the couple to the other, means for opening and closing the gripping devices at the sheet-taking point, and means for opening the gripping devices before the sheet has completed its forward movement, whereby the sheet is caused to pass onward between the members of the grippers to the delivery-point, substantially as described.

18. The combination with a printing-couple, of a carriage, gripping devices and stopping devices mounted thereon, means for reciprocating the carriage from one side of the couple to the other in a plane at an angle to the horizontal, means for opening and closing the gripping devices at the sheet-taking point, and means for opening the gripping devices before the sheet has completed its forward movement, whereby the sheet is caused to pass onward between the members of the grippers to the delivery-point, substantially as described.

19. The combination with a printing-couple one or both members of the couple having portions cut away, of a carriage, gripping devices mounted thereon, means for reciprocating the carriage at an angle to the horizontal and from one side of the couple to the other, means for opening and closing the gripping devices at the sheet-taking point, and means for opening the gripping devices before the sheet has completed its forward movement whereby the sheet is caused to pass onward between the members of the grippers to the delivery-point, substantially as described.

20. The combination with a printing-couple one or both members of the couple having portions cut away, of a carriage, gripping devices and stopping devices mounted thereon, means for reciprocating the carriage from one side of the couple to the other in a plane at an angle to the horizontal, means for opening and closing the gripping devices at the sheet-taking point, and means for opening the gripping devices before the sheet has completed its forward movement, whereby the sheet is caused to pass onward between the members of the grippers to the delivery-point, substantially as described.

21. The combination with a printing-couple, of a carriage, gripping and sheet-stopping devices mounted on the carriage, a rack connected to the carriage, a pinion in engagement therewith, a cam, and suitable connections between the cam and the pinion whereby the carriage is caused to reciprocate from one side of the couple to the other, substantially as described.



22. The combination with a printing-couple, one or both members of the couple having portions cut away, of a carriage, gripping and sheet-stopping devices mounted on the carriage, a rack connected to the carriage, a pinion in engagement therewith, a cam, and suitable connections between the cam and the pinion whereby the carriage is caused to reciprocate from one side of the couple to the other, substantially as described.

23. The combination with a printing-couple, one or both of its members having portions cut away, of a carriage, gripping and stopping devices mounted on the carriage, tracks for the carriage arranged at an angle to the horizontal, means for opening and closing the grippers at the sheet-taking point, means for reciprocating the carriage, said means operating to bring the carriage to a stop before the sheet has completed its forward movement, and means for opening the grippers to allow the sheet to pass through them, substantially as described.

24. The combination with a printing-couple, of a carriage, gripping and stopping devices mounted thereon, means for opening and closing the gripping devices at the sheet-taking point, means for reciprocating the carriage, said means being constructed to cause a dwell in the movement of the carriage at the sheet-taking point and to bring the carriage to a stop before the sheet has completed its forward movement, whereby the sheet is caused to pass between the members of the grippers, and means for opening the grippers as the carriage is stopped, substantially as described.

25. The combination with a printing-couple, of a carriage, gripping and sheet-stopping devices mounted thereon, means for reciprocating the carriage to cause the sheet to pass between the members of the couple, said means being constructed to bring the carriage to a stop at the sheet-taking point, and gripper-operating devices, substantially as described.

26. The combination with a continuously-rotating printing-couple, of a carriage, gripping and sheet-stopping devices mounted thereon, means for reciprocating the carriage to cause the sheet to pass between the members of the couple, said means being constructed to bring the carriage to a stop at the sheet-taking point, and gripper-operating devices, substantially as described.

27. The combination with a continuously-rotating printing-couple, one or both members of the couple having portions cut away, of a carriage, gripping and sheet-stopping devices mounted thereon, means for reciprocating the carriage to cause the sheet to pass between the members of the couple, said means being constructed to bring the carriage to a stop at the sheet-taking point, and gripper-operating devices, substantially as described.

28. The combination with a printing-couple, of a carriage, gripping and stopping devices mounted thereon, means for reciprocating

the carriage, said means being constructed to cause a dwell in the movement of the carriage at the sheet-taking and sheet-releasing points, means including an arm for controlling the opening of the grippers at the sheet-taking point, means for moving the arm, and means including a cam for opening the grippers at the sheet-releasing point, substantially as described.

29. The combination with a printing-couple, of a carriage, gripping and sheet-stopping devices mounted thereon, means for reciprocating the carriage at an angle to the horizontal to cause the sheet to pass between the members of the couple, said means being constructed to bring the carriage to a stop at the sheet-taking point, and gripper-operating devices, substantially as described.

30. The combination with a continuously-rotating printing-couple, of a carriage, gripping and sheet-stopping devices mounted thereon, means for reciprocating the carriage at an angle to the horizontal to cause the sheet to pass between the members of the couple, said means being constructed to bring the carriage to a stop at the sheet-taking point, and gripper-operating devices, substantially as described.

31. The combination with a continuously-rotating printing-couple one or both members of the couple having portions cut away, of a carriage, gripping and sheet-stopping devices mounted thereon, means for reciprocating the carriage at an angle to the horizontal to cause the sheet to pass between the members of the couple, said means being constructed to bring the carriage to a stop at the sheet-taking point, and gripper-operating devices, substantially as described.

32. The combination with a printing couple, of a carriage, gripping and sheet-stopping devices mounted thereon, means for reciprocating the carriage at an angle to the horizontal, said means being constructed to cause a dwell in the movement of the carriage at the sheet-taking and sheet-releasing points, means including an arm for controlling the opening of the grippers at the sheet-taking point, means for moving the arm, and means including a cam for opening the grippers at the sheet-releasing point, substantially as described.

33. The combination with a printing-couple comprising a pair of rotating cylinders, of a carriage, gripping and stopping devices mounted thereon, means for reciprocating the carriage from one side of the couple to the other, and registering means between the carriage and the printing member of the couple, substantially as described.

34. The combination with a printing-couple comprising a pair of rotating cylinders, one or both of said cylinders having portions cut away, of a carriage, gripping and stopping devices mounted thereon, means for reciprocating the carriage from one side of the couple



to the other, and registering means between the carriage and the printing member of the couple, substantially as described.

35. The combination with a printing-couple comprising a pair of rotating cylinders, of means for adjusting one member of the couple with respect to the other so as to vary the space between the members of the couple, whereby it is adapted to print upon material of different thicknesses, a carriage, gripping and stopping devices mounted on the carriage, means for reciprocating the carriage from one side of the couple to the other, registering means between the carriage and one member of the couple, and means for adjusting said registering means according to the position of the members of the couple, substantially as described.

36. The combination with a printing-couple comprising a pair of rotating cylinders, one or both of said cylinders having portions cut away, of means for adjusting one member of the couple with respect to the other so as to vary the space between the members of the couple, whereby it is adapted to print upon material of different thicknesses, a carriage, gripping and stopping devices mounted on the carriage, means for reciprocating the carriage from one side of the couple to the other, registering means between the carriage and one member of the couple, and means for adjusting said registering means according to the position of the members of the couple, substantially as described.

37. The combination with a printing-couple comprising a pair of rotating cylinders, one or both of said cylinders having portions cut away, of means for adjusting the printing member of the couple with respect to the other member, whereby the couple is adapted to print upon material of different thicknesses, a carriage, gripping and stopping devices mounted on the carriage, means for reciprocating the carriage from one side of the couple to the other, a registering mechanism between the carriage and the printing member, said mechanism including a rack and segment, and means for adjusting said registering mechanism in accordance with the position of the printing member, substantially as described.

38. The combination with a printing-couple comprising a pair of rotating cylinders, one or both cylinders having portions cut away, of means for varying the distance between the cylinders whereby the couple is adapted to print on material of different thicknesses, a carriage, gripping and stopping devices mounted on the carriage, means for reciprocating the carriage from one side of the couple to the other, means including a movable arm for opening and closing the gripping devices at the sheet-taking point, means including a stationary cam for opening the gripping devices at the sheet-releasing point, said means being arranged to operate upon the gripping devices before the sheet has reached the limit

of its forward travel, a registering mechanism between one of the members of the couple and the carriage, and means for adjusting said mechanism according to the position of the members of the couple, substantially as described.

39. The combination with a printing-couple comprising a pair of rotating cylinders, one or both cylinders having portions cut away, of means for varying the distance between the cylinders whereby the couple is adapted to print on material of different thicknesses, a carriage, gripping and stopping devices mounted on the carriage, means for reciprocating the carriage from one side of the couple to the other at an angle to the horizontal, means including a movable arm for opening and closing the gripping devices at the sheet-taking point, means including a stationary cam for opening the gripping devices at the sheet-releasing point, said means being arranged to operate upon the gripping devices before the sheet has reached the limit of its forward travel, a registering mechanism between one of the members of the couple and the carriage, and means for adjusting said mechanism according to the position of the members of the couple, substantially as described.

40. The combination with a printing-couple comprising a printing-cylinder having a transfer-surface and having a portion cut away, and a cooperating cylinder having an ink-applying surface and an impression-surface, said surfaces being spaced from each other whereby cut-away portions are provided, of a carriage, gripping and stopping devices mounted on the carriage, means for reciprocating the carriage from one side of the couple to the other, means for opening and closing the gripping devices at the sheet-taking point, means for opening the gripping devices at the sheet-releasing point, said last-named means being arranged to operate before the sheet has reached the limit of its forward movement, means for moving the printing-cylinder away from its companion cylinder after the ink has been applied thereto and before the printing and impression surfaces come into cooperative relation, means for varying the distance through which said printing-cylinder is moved, registering mechanism between the printing-cylinder and the carriage, and means for adjusting said registering mechanism according to the position of the printing-cylinder, substantially as described.

41. The combination with a printing-couple comprising a printing-cylinder having a transfer-surface and having a portion cut away, and a cooperating cylinder having an ink-applying surface and an impression-surface, said surfaces being spaced from each other whereby cut-away portions are provided, of a carriage, gripping and stopping devices mounted on the carriage, means for reciprocating the carriage from one side of the couple to the other at an angle to the horizontal,



means for opening and closing the gripping devices at the sheet-taking point, means for opening the grippers at the sheet-releasing point, said last-named means being arranged  
5 to operate before the sheet has reached the limit of its forward movement, means for moving the printing-cylinder away from its companion cylinder after the ink has been applied thereto and before the printing and  
10 impression surfaces come into coöperative relation, means for varying the distance through which said printing-cylinder is

moved, registering mechanism between the printing-cylinder and the carriage, and means for adjusting said registering mechanism according to the position of the printing-cylinder, substantially as described. 15

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOSEPH WHITE.

Witnesses:

F. W. H. CRANE,  
W. F. MORGAN.