

R. A. FREEMAN.
DELIVERY MECHANISM.
APPLICATION FILED MAY 1, 1913.

Patented Dec. 21, 1915.
4 SHEETS—SHEET 1.

1,164,802.

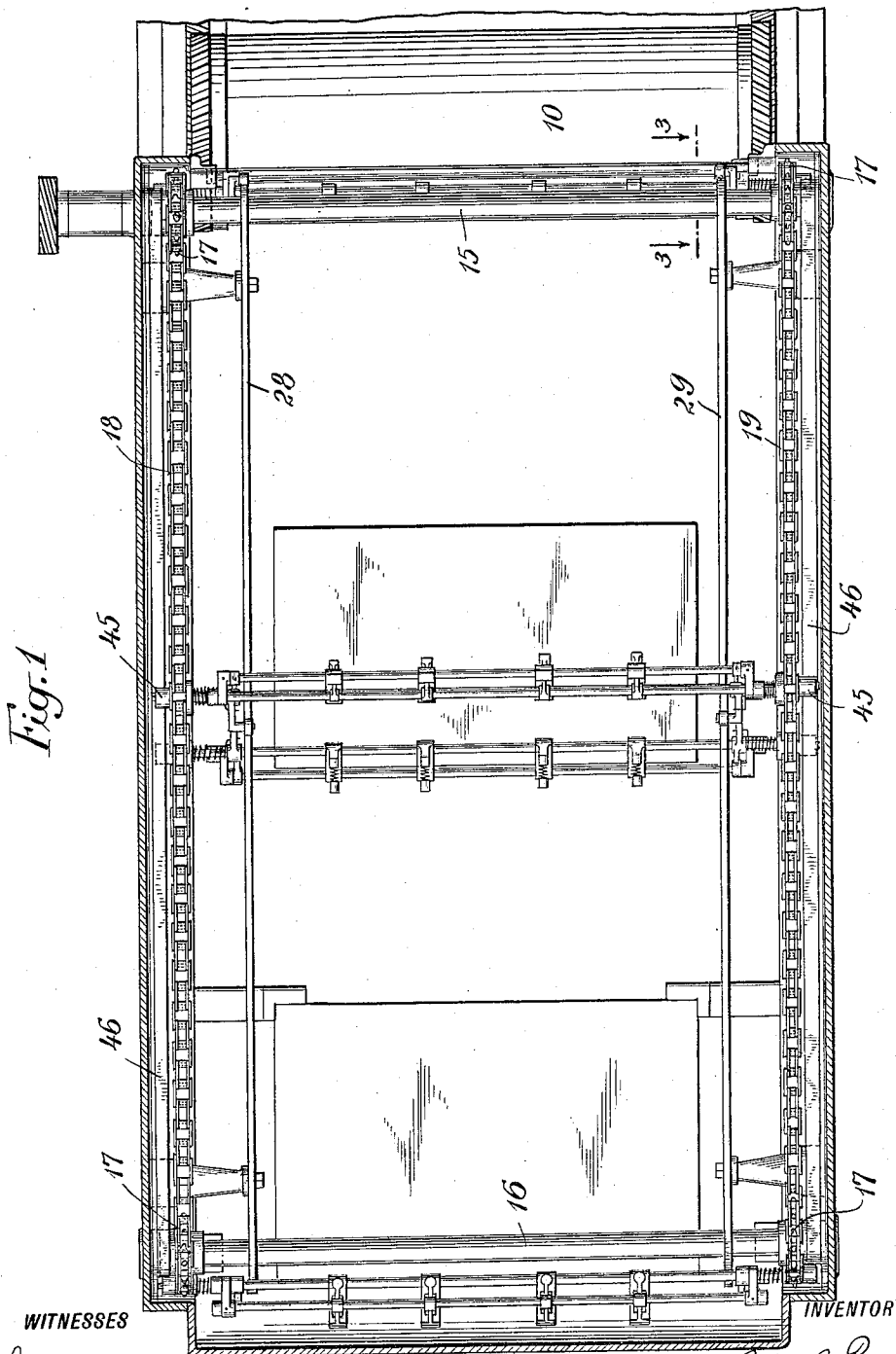


Fig. 1

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Fig. 2,

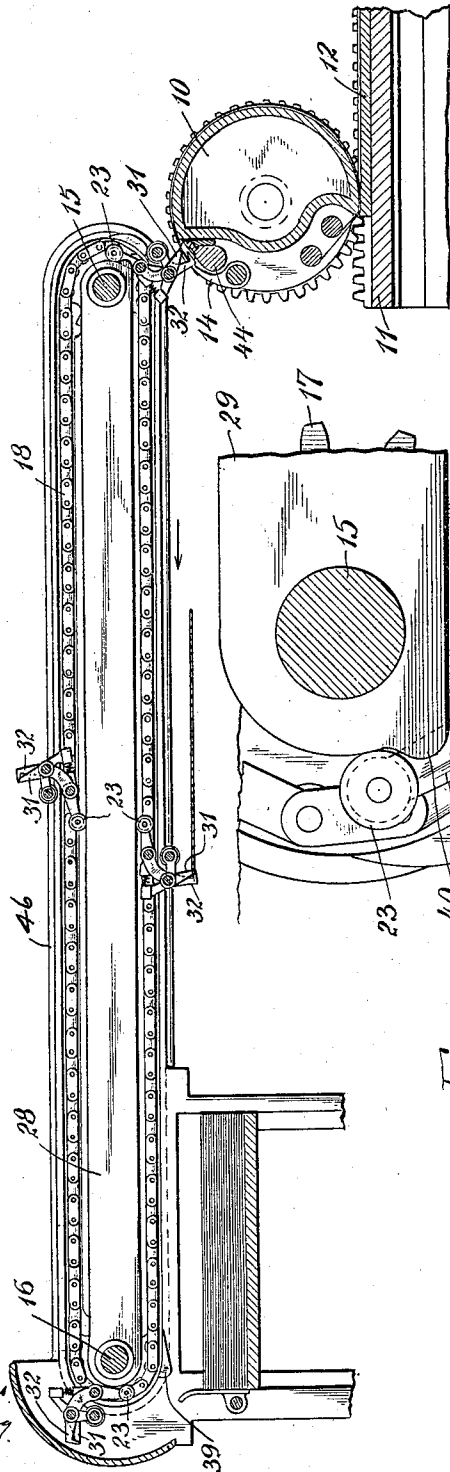
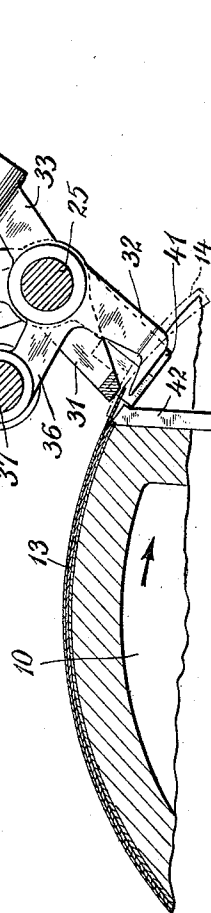


Fig. 3,



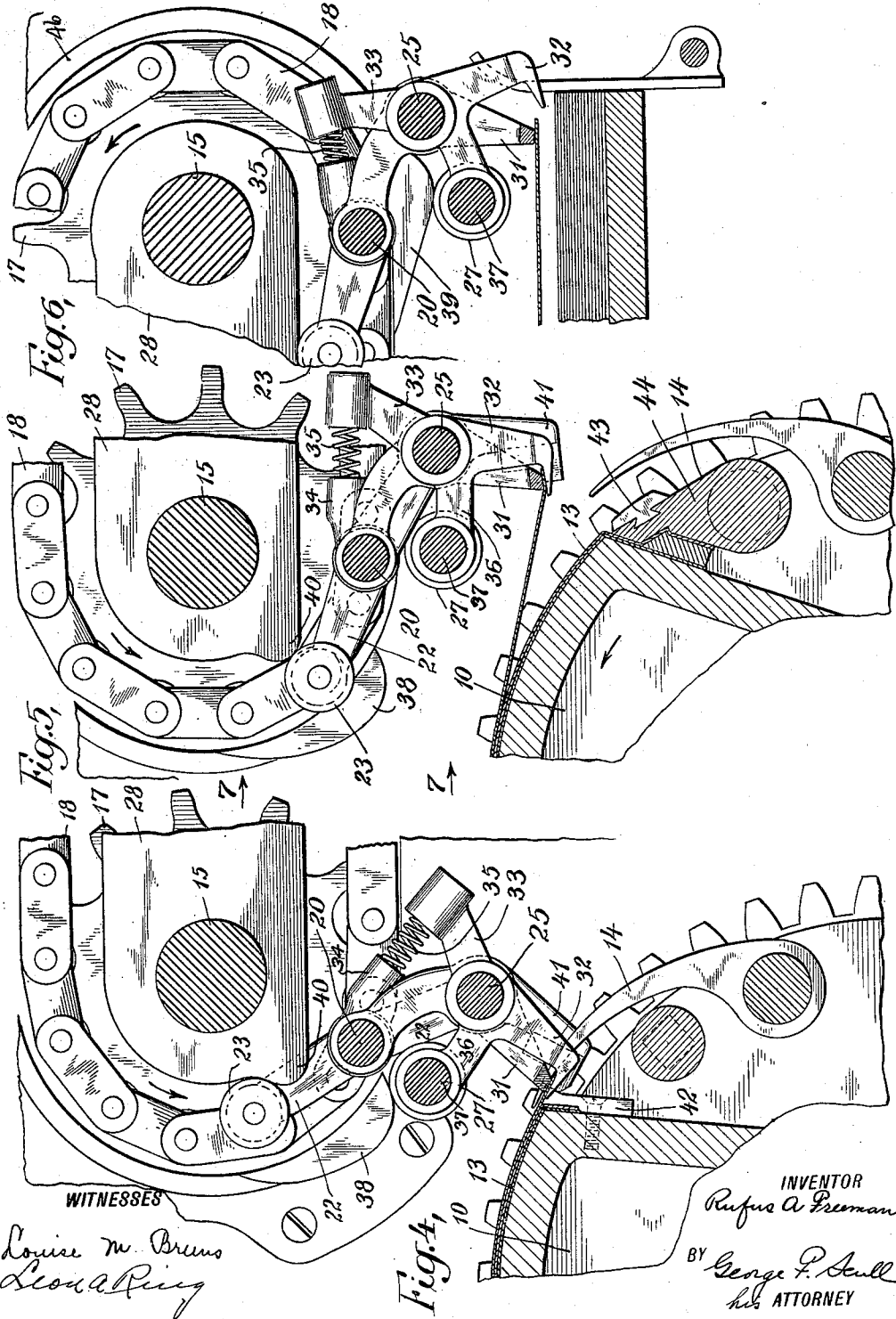
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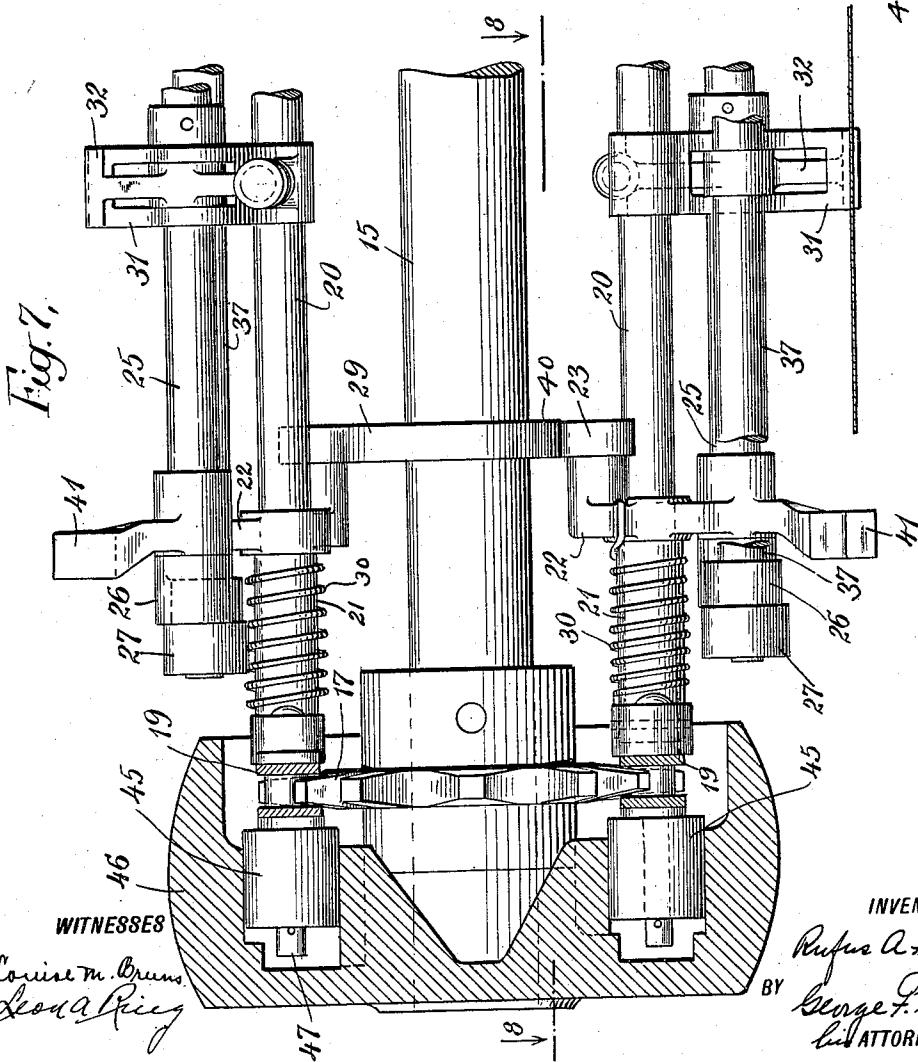
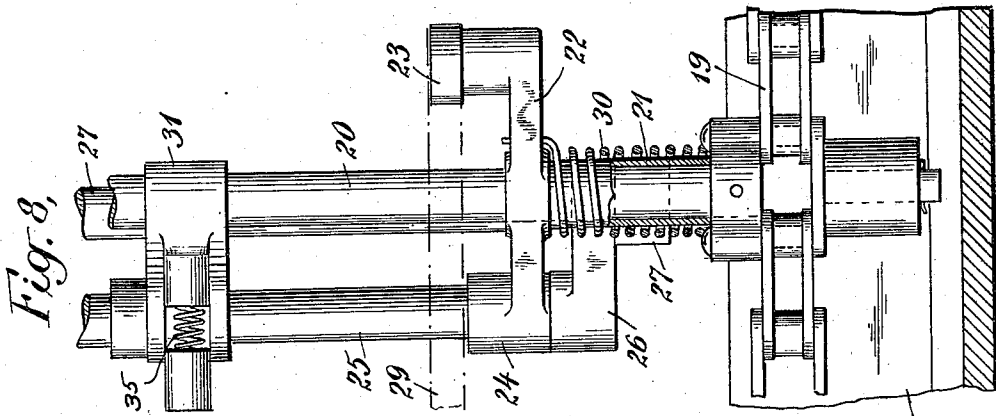
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4 SHEETS—SHEET 4.



UNITED STATES PATENT OFFICE.

RUFUS A. FREEMAN, OF FLUSHING, NEW YORK, ASSIGNOR TO THE AUTOPRESS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

DELIVERY MECHANISM.

1,164,802.

Specification of Letters Patent.

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Application filed May 1, 1913. Serial No. 764,736.

To all whom it may concern:

Be it known that I, RUFUS A. FREEMAN, a citizen of the United States, and a resident of Flushing, in the county of Queens and State of New York, have invented certain new and useful Improvements in Delivery Mechanism, of which the following is a specification.

My invention relates to sheet delivery mechanism for printing presses or the like, and more particularly, for use in connection with that form of press in which the impression cylinder is rotated as well as reciprocated bodily back and forth over the form, such a form of press being illustrated in the patents to Barnett No. 829,248 and No. 826,825.

One of the desirable features of a sheet delivery mechanism is the certainty with which each sheet will be engaged by the delivery mechanism and removed from the sheet carrier, which is usually an impression cylinder. This is especially desirable in machines like that referred to, in which the cylinder reciprocates as well as rotates, since, if the sheet is not properly taken from the cylinder, the reverse motion of it will cause the sheet to be dropped into the form and inking rollers. The form of press referred to presents great difficulties, however, in securing this certainty of delivery, since the position of the cylinder at the end of its reciprocation, at which time the sheet is ready for delivery, is subject to variations due to varying speeds or to wear or looseness in the parts.

One of the objects of my invention is to provide a mechanism which will be simple in construction and yet capable of operation in connection with high speed machines.

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

In the accompanying drawings, Figure 1 represents a longitudinal plan view of my novel delivery mechanism with a portion of the printing mechanism to which it is connected, certain of the chain guards being cut away to more clearly disclose the mechanism. Fig. 2 represents a sectional side elevation of my novel delivery mechanism with an

impression cylinder and type bed, also in section. Fig. 3 represents a sectional side elevation taken on the line 3—3, of Fig. 1, much enlarged. Figs. 4, 5 and 6 represent in enlarged views my novel gripper mechanism in successive positions as it is taking and delivering a sheet. Fig. 7 is an end elevation of Fig. 5 looking in the direction of the arrow 7. Fig. 8 is a plan view of a portion of Fig. 7 taken on the line 8—8.

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

Referring now to Figs. 1 and 2, 10 is the impression cylinder of that form of printing press which I have chosen for purposes of illustration in connection with my novel delivery mechanism. 11 is the form bed cooperating with the cylinder 10 and carrying the form 12. This bed and cylinder are given alternate reciprocations, as indicated in the patents to Barnett referred to, the cylinder 10 rotating as it reciprocates so that the edge of the sheet held to the impression surface 13 of the cylinder 10 by the grippers 14 has a cycloidal motion. The rotation of the cylinder 10 is produced by the cooperation of the gear teeth shown on the end of the cylinder with the racks shown as carried by the form bed 11. Mounted on the shafts 15—16 are two pairs of sprocket wheels 17, 17, over which passes a pair of chains 18, 19. The shaft 15 is driven through suitable gearing so that the chains 18, 19 make a given number of turns for a given number of cycles of operation of the printing machine. Extending across the chains 18, 19, and supported thereby, are a series of shafts, each supporting one or more pairs of grippers to carry the sheets, the number of these sets of grippers being proportioned so that at the speed of the chain one set of grippers will be presented each time a sheet is carried by the impression cylinder to the point indicated in Fig. 2. A description of any one set of these grippers will, of course, apply to all of the others.

Referring now to Figs. 2, 3, 7, and 8, 20 is a shaft carried in and fastened to sockets 21 attached to the chains 18, 19 as shown particularly in Fig. 8. On either end of the shaft 20 is mounted a cam lever 22 carrying

a cam roller 23, the cam lever 22 being shaped at its other end to form a bearing 24 to support a shaft 25. On either end of the shaft 25 is a cam lever 26 carrying a cam roller 27. The cam rollers 23 run on fixed cams 28, 29, thus controlling the position of the shaft 25, the rollers 23 being held against the cams 28, 29 by coil springs 30 bearing against the levers 22 and attached at the other end to the sockets 21.

Each pair of the sheet grippers, as shown particularly in Fig. 3, comprises an abutment member 31 having a socket extending over the shaft 25, and extending upwardly to form another socket passing over the shaft 20, the other portion of the grippers being the movable member 32, also carrying a socket passing over the shaft 25, and having one arm 33 carrying a spring socket between which and a socket 34 attached to the abutment 31, is placed a coil spring 35. This spring, therefore, tends normally to close the lower portion of the movable member 32 on the lower abutment of the member 31. The movable member 32 is provided with an arm 36 formed into a socket or bearing through which passes a shaft 37, this shaft carrying the cam rollers 27 which move in the plane of the fixed cams 38, 39. As will be seen by reference to Fig. 3, when the cam rollers 27 run up the cams 38, the shaft 37 will be moved downward, thus swinging each of the movable members 32 around the shaft 25 and compressing the spring 35 to open the grippers. When the rollers 27 pass down the cams 38, the springs 35 close the movable member 32 on the fixed abutment 31.

Since the shaft 25 is carried by the levers 22 pivoted on the shaft 20, it is obvious that the motion of the cam rollers 23 will determine the relative position between the shaft 25 and the chains 18, 19. The fixed cams 28, 29 are so shaped that this relative position is not altered as the grippers are carried from one end to the other of Fig. 2, except at the point where the sheet is about to be taken by the grippers. At this end is formed the projections 40. As the rollers 23 are carried around these projections, it is obvious that the shaft 25 will be carried around the shaft 20 in the manner indicated by the relative positions of these shafts in Figs. 4 and 5. This serves to give a motion to the grippers other than that which would normally be given by the motion of the chain carriers, and serves to lift the sheet from the cylinder as the front edge of the impression surface thereof is moving downward. It also enables me to arrange my mechanism so that, at the time the front edge of the sheet is taken by the grippers, the grippers and the impression surface are traveling substantially in the same direction, while after the sheet is taken, I am

enabled to lift the sheet into the plane in which it is to be carried to be delivered. To insure, however, that the grippers will be in the correct relation to the cylinder regardless of the exact position to which the cylinder is carried at the time the sheet is to be taken, I provide at either end of the shaft 25 and forming part of the cam levers 22, toe members 41, which are arranged to be engaged by a portion of the cylinder 10. In the arrangement illustrated, this contact is with members 42 attached to the front edge of the impression surface of the cylinder 10. This engagement serves to position the shaft 25, and therefore, the grippers 32, 31 in constant relation with the front edge of the impression surface of the cylinder, regardless of the exact position to which the cylinder may be turned at the time of such engagement, and also regardless of the motion which would normally be given to the grippers by the projections 40. In other words, the cams 28, 29, and the projections 40 thereon, initially position the grippers, while the final positioning or correction of any errors due to changes of position of the cylinder 10, at the time the sheet is taken, or to the wear or inexactness of the projections 40, is done by contact between the members 41 and the cylinder itself. It will also be understood that the cams 38 are located so that the springs 35 are permitted to close the grippers on the sheet at the time when the grippers are properly located with relation to the impression surface, and, therefore, with the sheet. The cams 39 at the other end of the press serve to open the grippers to permit the sheet to be dropped, as shown particularly in Fig. 6. As is shown in Fig. 5, in the particular form of press which I have chosen for purposes of illustration, shortly after the sheet is grasped by the grippers, the cylinder is reversed in its rotation and carried backward, while the sheet is carried forward to the delivery pile. By reason of the exact position of my delivery grippers, I am enabled to delay the opening of my impression cylinder grippers 14 until substantially the time that the sheet is under control of the delivery grippers, thus insuring certainty in each sheet being taken by the delivery mechanism. This opening of the grippers 14 is done in the usual manner by fixed cams on the side of the machine.

The arrangement of the shafts 20, 25 and 37 is such that very small diameters may be used, since each set of grippers serves as a locking and tying member for each of these shafts, and since these grippers are distributed longitudinally across the press at relatively short intervals, the three shafts are placed so as to form substantially an integral structure. This is particularly important since, with the form of gripper carriers

which I have illustrated, it is desirable to have the weight carried thereby as small as possible. It is, however, necessary also that these grippers be sufficiently rigidly supported to insure their grasping the sheet under all circumstances.

In order to permit the sheet delivery grippers to grasp the sheet, I provide as a nipping surface between the impression cylinder grippers 14 and the cylinder itself, a series of pads 43, one of these pads being placed under each of the grippers 14. This leaves a space between the grippers 14 into which the sheet delivery grippers may be carried to grasp the edge of the sheet. The pads 43 are dove-tailed as shown in Fig. 5, and slide in a groove in the tympan clamp bar 44 so that they may be adjusted to suit the position in which the grippers 14 may be placed.

The chains 18, 19, are supported on rollers 45 running on tracks in members 46, each of these rollers being supported on a stud 47 rigidly attached to the chains 18, 19. The tracks in the members 46 are carried around the ends of the members so that the chains are held to the sprockets on the shafts 15, 16.

In order to secure greater certainty of action and rigidity of parts with a comparatively light structure, I preferably duplicate on each side of the machine, such parts as the various cams for opening and positioning the grippers, so as to do away with as much torsion on the various shafts as possible. These parts may be omitted on one side, however, if desired.

It will be understood that while I have shown my delivery mechanism in connection with a cylinder having both a reciprocating and rotating motion, many features of it may be used in connection with the ordinary form of printing machine in which the cylinder rotates in one direction only on stationary bearings, or indeed, with any form of sheet carrier which will bring the head of the sheet to a position to be taken by the delivery grippers.

It will be understood that while I have shown continuously moving chains for supporting and moving my grippers toward and away from the sheet carrier, any other suitable form of support, such as the ordinary reciprocating carriage, may be used for this purpose.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

1. In a printing press, a sheet carrying cylinder, means to oscillate said cylinder on its axis, a sheet gripper, means to cause said gripper to grasp a sheet on said cylinder and while said cylinder is rotating in one direction, and to remove the sheet as said cylinder is rotating in the opposite direction, and means connected to said gripper and

arranged to contact with said cylinder to position said gripper in relation to said cylinder at the time the sheet is grasped.

2. In a printing press, a sheet carrying cylinder, means to reciprocate and rotate said cylinder, a sheet gripper, means to cause said gripper to grasp a sheet on said cylinder and while said cylinder is moving in one direction, and to remove the sheet as said cylinder is moving in the opposite direction, and means connected to said gripper and arranged to contact with said cylinder to position said gripper in relation to said cylinder at the time the sheet is grasped.

3. In a printing press, a sheet carrying cylinder, means to reciprocate and rotate said cylinder, a sheet gripper, means to cause said gripper to grasp a sheet on said cylinder and while said cylinder is moving in one direction, and to lift the edge of the sheet away from said cylinder before said cylinder reaches the end of its reciprocation.

4. In a printing press, a sheet carrying cylinder having sheet grippers thereon, means to oscillate said cylinder on its axis, a sheet delivery gripper, means to support and move said sheet delivery gripper in a path which intersects the path of said sheet carrying cylinder grippers, a cam to control the initial position of said sheet delivery gripper at the intersection of said paths and a device connected to said gripper and constructed and arranged to contact with said cylinder to locate said gripper definitely in relation to said cylinder at the intersection of said paths in position to take a sheet from said cylinder, and means to close said sheet delivery gripper when so definitely located.

5. In a printing press, an impression cylinder having an impression surface and sheet grippers thereon, means to rotate said cylinder, means to support and move a sheet delivery gripper in a path intersecting the path of a sheet on said impression surface, means, independent of the gripper supporting and moving means, to locate said gripper initially at the intersection of said paths and a device connected to said gripper and contacting with said cylinder to locate definitely said sheet delivery gripper in relation to the front of said impression surface, and means to close said gripper when so definitely located.

6. In a printing press, a sheet carrying cylinder having a sheet carrying surface and sheet grippers thereon, means to rotate said cylinder, a shaft having its axis parallel to the axis of said cylinder and means to support and move said shaft toward and away from said cylinder, a sheet gripper carried by said shaft and constructed and arranged to move in a path which intersects the path of a sheet on said sheet carrying surface, a cam arranged to locate initially the position of said gripper at the intersection of said

paths, and a device mounted on said shaft and arranged to contact with said cylinder to locate said gripper definitely in relation to said cylinder at the intersection of said paths and means to close said grippers when so definitely located.

7. In a printing press, a sheet carrying cylinder, means to reciprocate and rotate said cylinder, a sheet delivery gripper, a continuously moving carrier constructed and arranged to support and move said gripper in a path which intersects the path of a sheet on said cylinder, means to close said gripper on a sheet on said cylinder as said gripper is passing the intersection of said paths, and means to give said grippers bodily movement independent of the movement of said carrier after said grippers have closed on the sheet.

8. In a printing press, a sheet carrying cylinder, means to rotate said cylinder, a sheet gripper, a continuously moving carrier constructed and arranged to move said gripper in a path intersecting the path of a sheet on said sheet carrying cylinder, a cam constructed and arranged to move said gripper bodily to locate it initially as said gripper passes the intersection of said paths and a device connected to said gripper and arranged to contact with said cylinder, to

locate said gripper definitely with relation to said cylinder at the said point of intersection.

9. In a printing press, a sheet carrying cylinder, means to rotate said cylinder, a sheet gripper, a continuously moving carrier constructed and arranged to move said gripper in a path intersecting the path of a sheet on said sheet carrying cylinder, a fixed cam constructed and arranged to control the path of said gripper as it is moved by said continuously moving carrier and means, operated by the motion of said cylinder, to locate said gripper definitely with relation to said cylinder at said point of intersection.

10. In a printing press, a sheet carrying cylinder, means to rotate said cylinder, a sheet gripper, a supporting shaft therefor, a second shaft parallel with and spaced apart from said first shaft, a carrier for said second shaft constructed and arranged to move said shafts and gripper toward and away from said cylinder and means to move said first shaft around said second shaft to give a bodily movement to said gripper independent of the motion of said carrier.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."