W. J. MAIN.

SHEET DELIVERY MECHANISM.

APPLICATION FILED JAN. 7, 1909.

1,068,597.

Patented July 29, 1913.

2 SHEETS—SHEET 1.

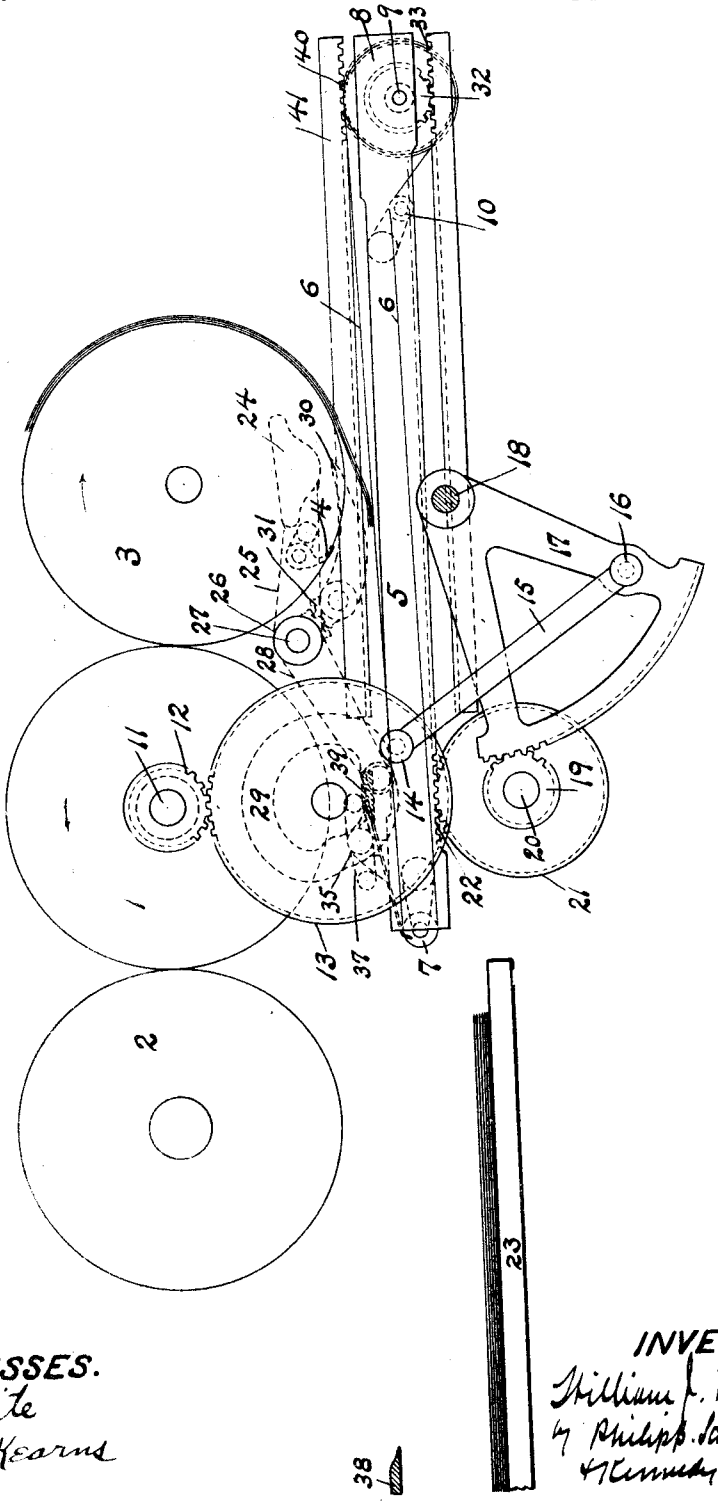

FIG. 1.

WITNESSES.

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3 SHEETS—SHEET 2.

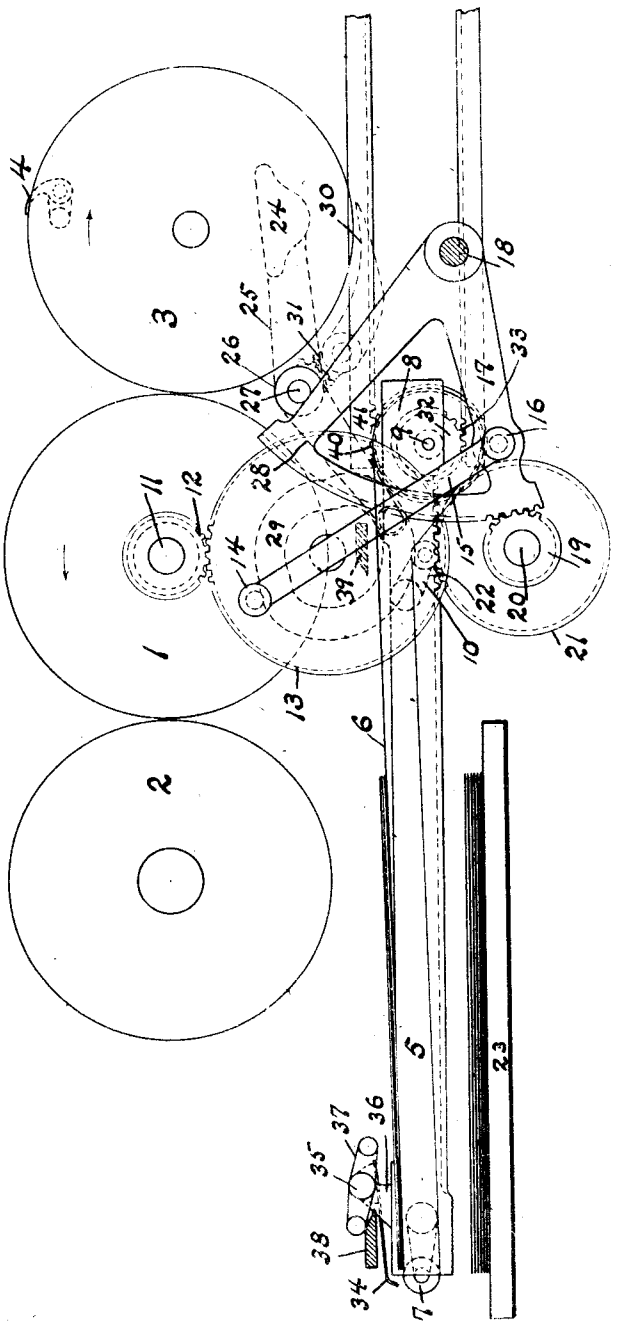

FIG. 2.

WITNESSES.

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UNITED STATES PATENT OFFICE.

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SHEET-DELIVERY MECHANISM.

1,068,597. Specification of Letters Patent. Patented July 29, 1913.

Application filed January 7, 1909. Serial No. 471,096.

To all whom it may concern:

Be it known that I, WILLIAM J. MAIN, a citizen of the United States, residing at Westport, county of Fairfield, and State of Connecticut, have invented certain new and useful Improvements in Sheet-Delivery Mechanisms, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in sheet delivery mechanism of the type usually characterized as "flat deliveries."

In machines employing continuously operating printing couples, such, for instance, as multi-revolution bed and cylinder presses and which employ flat deliveries, the sheets are usually received from the sheet delivering cylinder, which is ordinarily the impression cylinder of a printing couple, by a set of tapes located in front of the cylinder. In these machines, the sheets are taken from these receiving tapes by a carriage which reciprocates from a position beneath the receiving tapes to a position over a receiving table. In some of these machines, the carriage is provided with a set of forwarding tapes which take the sheet from the receiving tapes. These forwarding tapes remain stationary during the forward stroke of the carriage, but as it starts on its return movement the tapes are driven at a rate of speed corresponding to the movement of the carriage, the sheet being thus run off the carriage onto the receiving table. In other machines, the sheets are taken from the receiving tapes by a platform on the carriage consisting of a set of strips or sticks, and after the carriage has completed its movement to the position over the receiving table and begins its return movement, the sheets are operated upon by a set of propelling wheels driven at a proper rate of speed to cause the sheet to be run off the sticks onto the receiving table. It will be observed that the mechanisms referred to all include a sheet receiving construction which is intermediate the carriage and the sheet delivering cylinder, that is, in none of them is the sheet delivered from the delivery cylinder directly to the carriage.

The present invention has for its object to provide a construction of delivery mechanism employing a reciprocating carriage in which the sheets shall be received by the carriage directly from the sheet delivering cylinder, thereby rendering it unnecessary to employ intermediate sheet receiving mechanism between the cylinder and the carriage.

A further object of the invention is to provide an improved sheet delivery mechanism of the character referred to in which the sheets shall be received directly from the sheet delivering cylinder onto the carriage and in which mechanism is provided for preventing bending, buckling, or, as it is usually termed "stumbling" of the sheets during the delivery operation.

With these objects specifically referred to and others 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.

Referring to the drawings—Figure 1 is a side elevation of so much of a printing machine and flat delivery mechanism as is necessary to an understanding of the invention. Fig. 2 is a view similar to Fig. 1, but showing the parts in different position.

Referring to the drawings which illustrate one embodiment of the invention, 1 indicates the impression cylinder of a rotary printing couple, the printing cylinder of the couple being indicated at 2. Constructions embodying the invention may include a collecting cylinder which takes the sheets from the impression cylinder 1, such a cylinder being illustrated in the drawings and marked 3, this cylinder being provided with the usual sheet taking grippers 4.

Constructions embodying the invention will include a reciprocating carriage, this carriage, in the particular construction illustrated, being marked 5. This carriage is arranged to reciprocate beneath the printing mechanism and to receive the sheets directly from the delivering cylinder which, in the particular construction illustrated, as has been stated, is the collecting cylinder 3. The carriage will be provided with a movable sheet receiving surface which surface will generally consist of tapes. In the particular construction illustrated, these tapes, marked 6, are supported at the forward end of the carriage by pulleys 7. At the rear end of the carriage, these tapes pass around

drums 8 mounted on a shaft 9 suitably supported in the side bars of the carriage. If desired, the usual tightening rolls may be employed, such rolls being indicated at 10. The mechanism by which the carriage is reciprocated may be of any suitable type. In the construction illustrated, the shaft 11 of the cylinder 1 is provided with a driving gear 12, this gear meshing with teeth formed on the periphery of a crank disk 13, the crank stud 14 of which is connected by a rod 15 to a stud 16 on a toothed sector 17 pivoted at 18 to the frame of the machine. The teeth of this sector 17 mesh with a gear wheel 19 supported on a shaft 20, this shaft being provided with a driving gear 21 which meshes with a rack 22 mounted on the carriage.

The reciprocating mechanism for the carriage whatever be its type will move the carriage from a sheet receiving position beneath the printing mechanism to a position over the sheet receiving table indicated at 23. The carriage is shown in its sheet receiving position in Fig. 1, and in this figure the grippers 4 are shown as having been open so as to permit the leading end of the sheets to drop upon the tapes 6.

The opening movement of the grippers may be effected in any suitable manner. In the particular construction illustrated, the grippers are opened by a cam 24 mounted on an arm 25 carried on a hub 26 supported on a cross-rod 27. The hub 26 has an operating arm 28 extending therefrom, this arm being provided with a roll which engages a cam groove 29 formed in the disk 13 before referred to. This gripper operating construction is of a well-known form and any other suitable construction may be substituted therefor. If desired, a stripper may be employed to insure the delivery of the leading ends of the sheets from the cylinder 3, such a stripper being illustrated at 30. This stripper has a toothed hub 31 which meshes with teeth formed on the hub 26 before referred to.

It will be understood that the carriage, at the time the sheets are being laid upon its receiving surface, is being given a movement toward the receiving table, so that the sheets will be laid upon the sheet receiving surface of the carriage which, as has been stated, will, in the best constructions, comprise tapes. In the best constructions, furthermore, embodying the invention, the sheet receiving surface will also be given a movement in the direction of the movement of the carriage during the delivery of the sheets, the purpose of which is to comb forward the sheets so as to prevent any buckling or bending of the same, this buckling or bending being termed by the printers "stumbling." While this movement of the sheet receiving surface may be effected by various means, in the construction illustrated, the shaft 9 which carries the tape drums 8 will be provided with a gear 32 which meshes with a rack 33 secured to the machine frame. As the carriage moves toward the delivery table, the drums will rotate and cause the tapes to travel during the movement of the carriage and, of course, in the direction of the carriage movement.

It may be desirable to provide means for preventing the sheets from being shot off the carriage by the movement of the tapes before the carriage reaches the end of its forward stroke. While these means, when they are employed, may be of varying constructions, as shown, they comprise stop fingers 34 mounted on a rock-shaft 35 supported in standards 36 on the carriage. This rock-shaft, in the particular construction shown, is provided with a double operating arm 37. Suitable devices for operating this stop will be provided. As shown, these operating devices include a cam 38 located at or near the end of the forward stroke of the carriage and a cam 39 located at or near the end of its return stroke. As usual in this class of devices, when the carriage begins its return stroke, the forwarding tapes are moved to run the sheets off the carriage onto a receiving table. This is effected in the construction illustrated by providing the shaft 9 with a gear 40 which meshes with a rack 41 supported alongside the path of movement of the carriage.

It will be understood that the gears 32 and 40 will be connected to the shaft 9 by clutches which permit the gears to run free of the shaft when the carriage is moved in one direction and clutch them to the shaft when the carriage is moved in the opposite direction. This construction of clutch is well understood in the art, and inasmuch as it has no bearing upon the present invention, a description and illustration thereof is omitted in the interest of brevity.

Changes and variations may be made in the construction by which the invention is carried into effect. The invention is not, therefore, to be confined to the particular construction herein shown and described.

What is claimed is:—

1. The combination with a delivery carriage, of a printing mechanism including a continuously rotating cylinder from which the carriage receives its sheets directly, means for reciprocating the carriage, said means operating to give the carriage a movement during the delivery of the sheet thereto, and means for moving the sheet receiving surface of the carriage during the movement of the carriage and in the direction of that movement.

2. The combination with a delivery carriage having sheet forwarding tapes, of a printing mechanism including a continu-

ously rotating cylinder from which the carriage receives its sheets directly, means for reciprocating the carriage, said means operating to give the carriage a movement during the delivery of the sheet thereto, and means for driving the tapes in the direction of movement of the carriage while the sheets are being deposited thereon.

3. The combination with a printing mechanism including a continuously rotating cylinder, of a delivery carriage located beneath the cylinder and receiving its sheets directly therefrom, means for reciprocating the carriage, and means for driving the sheet receiving surface of the carriage during the movement of the carriage and in the direction of that movement.

4. The combination with a printing mechanism including a continuously rotating cylinder, of a delivery carriage located beneath the cylinder and having sheet forwarding tapes, said carriage receiving its sheets directly from the cylinder, means for reciprocating the carriage, and means for driving the tapes in the direction of movement of the carriage while the sheets are being deposited thereon.

5. The combination with a delivery carriage provided with sheet forwarding-tapes, of a printing couple, a collecting cylinder for receiving sheets from the printing couple and delivering them to the tapes on the carriage, means for reciprocating the carriage, and means for driving the tapes during the sheet receiving movement of the carriage and in the direction of that movement.

6. The combination with a delivery carriage provided with sheet forwarding tapes, of a sheet stop at or near the delivery end of the carriage, a printing mechanism including a continuously rotating cylinder which delivers sheets to the tapes, means for reciprocating the carriage, means for driving the tapes during the sheet receiving movement of the carriage and in the direction of that movement, and means for operating the stop.

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

WILLIAM J. MAIN.

Witnesses:
WM. F. MORGAN,
H. CROCKER.