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W. K. HODGMAN.

PRINTING MACHINE.

APPLICATION FILED NOV. 10, 1902.

NO MODEL.

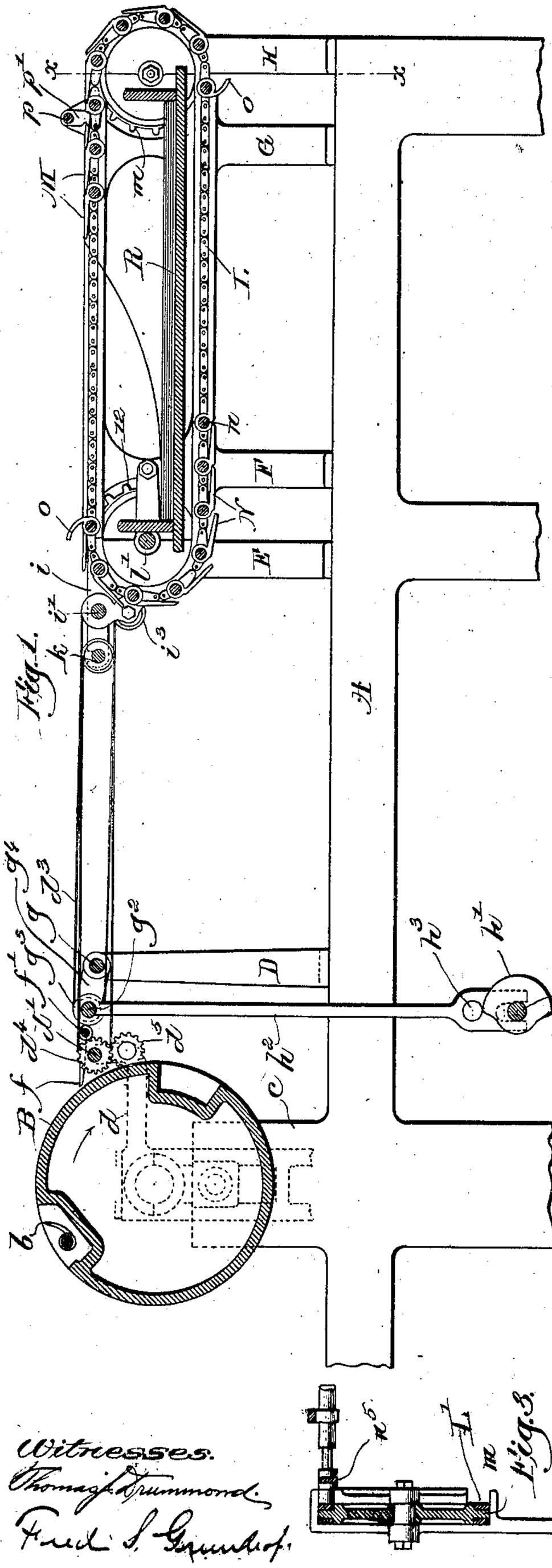

Fig. 1.

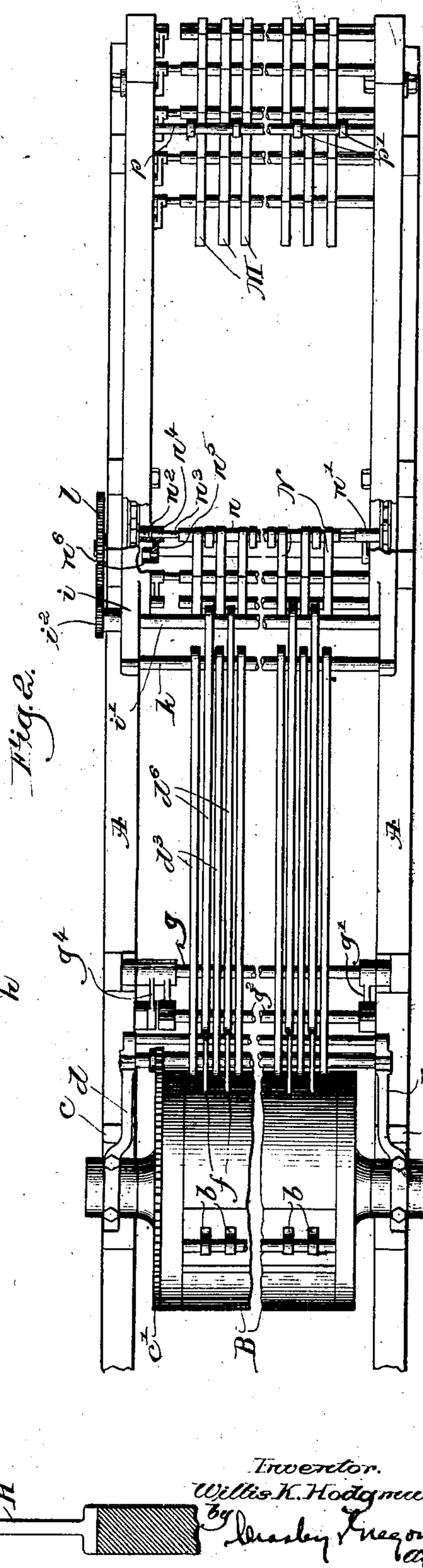

Fig. 2.

Fig. 3.

Witnesses.
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No. 735,977. Patented August 11, 1903.

UNITED STATES PATENT OFFICE.

WILLIS K. HODGMAN, OF TAUNTON, MASSACHUSETTS, ASSIGNOR TO HUBER-HODGMAN PRINTING PRESS COMPANY, OF TAUNTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 735,977, dated August 11, 1903.

Application filed November 10, 1902. Serial No. 130,630. (No model.)

To all whom it may concern:

Be it known that I, WILLIS K. HODGMAN, of Taunton, county of Bristol, State of Massachusetts, have invented an Improvement in Printing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The object of this invention is to provide a new and improved sheet-delivery and sheet carrying and piling mechanism for a printing-press, together adapted to take the printed sheets from the impression-cylinder of the press and pile the same in an orderly manner with the printed face uppermost without the use of any means for positively gripping or holding the several sheets.

The invention consists of the mechanism as described in the following specification and set forth more particularly in the claims appended thereto.

My invention is illustrated in the three figures of the drawings, in which—

Figure 1 is a view of a longitudinal central section of a sufficient portion of a printing-press to show my invention applied thereto. Fig. 2 is a top plan view of the same portion of a printing-press, showing the press as broken in two longitudinally and the two side portions thereof moved together, this being done merely for convenience of illustration. Fig. 3 is a sectional view taken on line $x\,x$, Fig. 1.

While my invention is illustrated in connection with a particular form of printing-press, it is obvious that it is adapted for use with any printing-press from which the sheets can be taken by a sheet-delivery mechanism such as shown. I have illustrated the form of printing-press in which a reciprocating bed is used and an impression-cylinder having two revolutions for each impression and having a vertical movement, so as to avoid the reciprocating bed when making the second of said revolutions. Referring to the drawings, A denotes a portion of the frame of such a printing-press, at one portion of which are brackets $c\,c$, in which the impression-cylinder is mounted. This cylinder B is provided with the usual gripping-fingers b and is journaled in the usual manner in a vertically-movable carriage (shown in dotted lines in Fig. 1) and has at one side thereof and integral with or firmly attached thereto a gear c'. Rising from the frame at different points are the several brackets D, E, F, G, and H, which serve to support the sheet-delivery mechanism and the sheet carrying and piling mechanism. The sheet-delivery mechanism is designed to take the sheet from the impression-cylinder and deliver the same to the sheet carrying and piling mechanism, reducing the speed of the sheet during such delivery. This reduction in speed is an essential feature of my invention and may obviously be secured in a number of different ways; but I prefer to secure such reduction in speed by the use of two sets of delivery-tapes which run at different speeds. A simple construction and arrangement of such tapes may be secured in the following manner.

Projecting from the vertically-movable frame in which the impression-cylinder is journaled are arms d, in which is journaled a shaft d', carrying a series of pulleys for the several tapes d^3 of one set and also carrying near the end of the shaft a gear-wheel d^4. Another gear-wheel d^5 is journaled in one of the arms d and intermeshes with the gear c' on the impression-cylinder and the gear d^4, thus serving to drive the shaft d' from the motion of the impression-cylinder B. A series of the usual stripper-fingers f project in proper relation to the impression-cylinder from a rod f', likewise journaled in the arm d. These stripper-fingers f alternate in the usual way with the several tapes. A shaft g is journaled at or near the top of the brackets D in substantially the same horizontal plane as the shaft d^5. This shaft g is provided at each end with projecting arms g', in the ends of which is journaled a shaft g^2, which latter shaft carries a series of pulleys g^3 for the several tapes d^6 of the second series of tapes. At one end of the said shaft g is a second projecting arm g^1, which is formed or connected with the arms g', so as to move therewith. A shaft h, connected with and driven by a suitable portion of the driving mechanism of the press, is journaled,

preferably, below the frame A and has mounted thereon a cam h', preferably of the shape shown. A rod h^2 is connected with the arm g^1 and is slotted, so as to reciprocate on the shaft h, and is provided with a pin or roller h^3 to coöperate with the cam h'. From this construction it will be seen that upon rotation of the shaft h through the medium of the cam h' the rod h^2 will be moved, so as to cause the shaft g^2, with the tape-carrying pulleys thereon, to occupy two different positions. The brackets E are also provided with projecting arms i, in which are journaled two shafts i' and k, the former of which carries a series of pulleys for guiding and carrying the set of tapes d^6 and the latter of which carries a series of pulleys for carrying and guiding the set of tapes d^3. The shaft i' is also provided at one end with a gear i^2, driven through the medium of a gear i^3, journaled in one of the arms i from a large gear l, hereinafter described. It will be noticed that the ends of the arms d, g', and i are notched, so that the shafts d', g^2, and k, which carry the tape-pulleys, may be easily removed for obvious purposes.

The sheet-delivery mechanism thus above described operates in the following manner: When the printed sheet is on the impression-cylinder and the forward end of the same has about reached the stripper-fingers f, the two sets of tapes d^3 d^6 occupy practically horizontal positions, the set d^6 being in a plane a trifle lower than the plane of the set d^3, and these sets of tapes are being run at different speeds. The speed of the tapes d^3 is governed by the speed of the gear c' on the impression-cylinder, and the speed of the tapes d^6 is much less than that of the tapes d^3 and is preferably about the same as the speed of the carrier of the carrying and piling mechanism, hereinafter described, and is governed by the gear l, above referred to. When the sheet reaches the stripper-fingers f, it is stripped from the impression-cylinder and passes within the control of the tapes d^3, by which it is carried along at a speed governed by the gears c' d^5 d^4, and preferably the speed of the impression-cylinder, until the cam h' in its rotation raises the rod h^2 and the shaft g^2 with the tape-pulleys g^3. This action of the cam h causes the sheet to be lifted from the tapes d^3 and to pass within the control of the tapes d^6, whereby its speed is reduced to a speed determined by the gears i, i^2, i^3, and l, which speed is preferably about equal to that of the carrier of the sheet carrying and piling mechanism. The sheet carrying and piling mechanism is supported by the brackets E, F, G, and H, which are extended and connected, as shown in the drawings, to form a skeleton frame and comprises in the form in which I have chosen to illustrate this feature of my invention an endless carrier provided with supporting-bridges and a device for holding the pile of sheets. A shaft l' is journaled in the brackets E and carries at one end the gear l, previously referred to, and is driven by connection with a suitable portion of the driving mechanism of the press which it is unnecessary to show or describe. This shaft is provided near each end with sprocket-wheels l^2. Corresponding sprocket-wheels of the same pitch of sprocket and preferably of the same size are journaled, the one in the bracket H on one side of the frame and the other on the bracket H on the other side of the frame, by short shafts bolted through the frame, as shown in Fig. 3 of the drawings. The endless carrier is composed of two sprocket-chains, one located in one side of the skeleton frame, supported by the brackets E, F, G, and H and carried and driven by one set of sprocket-wheels l^2 m, and the other is located in a corresponding position and driven and carried in a corresponding manner in the other side of the skeleton frame. These sprocket-chains L are connected at certain points by two series of bridges M N, which support the sheet at the proper time. I have shown and described two series of these bridges; but my endless carrier can be provided with one or a plurality of said series, the number of these series of bridges being determined by the length and speed of the carrier and other conditions known to one skilled in this art. Each bridge M or N comprises a shaft n, journaled at opposite points in the two sprocket-chains L. This shaft is journaled, preferably, as follows: The link-pin of one of the chains—as, for example, the one on the side away from the driving-gears—is extended, as shown at n', and the shaft n is recessed, so as to rest over and be journaled upon said extended pin n'. The corresponding link-pin of the opposite chain is likewise extended, as at n^2, and the shaft n at the corresponding end is reduced, as at n^3, to the diameter of the link-pin n^2. A sleeve n^4 is rigidly connected with the part n^3 and is journaled on the pin n^2. A rigid arm n^5 projects from the sleeve n^4 and carries at its end a projecting pin or roll n^6, which runs in a groove L', formed in the frame carrying the sprocket-chain. The shaft n carries a series of flat projecting arms, and thus forms the bridges M or N of the respective series. The projecting arms are rigidly attached to the shaft n in such relation with respect to the arms n^5 that when the pin or roll n^6 is in the horizontal portions of the groove L' the said bridges M and N will assume a horizontal position and are constructed of such length that when in said horizontal position they will together constitute a practically continuous bridge lengthwise of the sheet. The flat arms are in number sufficient to support the width of the sheet, and the number of the series is such as to support nearly, though preferably not entirely, the full length of the sheet. The first shaft (in the direction of movement) of each series of bridges is provided with a series of stop-fingers o, rigidly attached to the said shaft at such an angle that when the shaft, with its arms, reaches a po-

sition to receive the sheet from the delivery-tapes the said stops *o* will project upwardly and serve to aline and fix definitely the time of removal of the sheet from the delivery-tapes. The skeleton frame of the sheet delivery and piling mechanism is also provided near the end with a shaft *p*, carrying a series of downwardly-projecting stop-fingers *p'*. These stop-fingers project down between the bridges M or N and below the plane of the same and are placed at such a position on the framework as to check the movement of the sheet at the proper time for piling. The box R for receiving the pile of sheets is located within the path of the endless carrier and fastened to the skeleton framework, all as shown in the drawings.

From the above description of the construction of the sheet carrying and piling mechanism it will be seen that the operation thereof is as follows: The machine is so timed that when the first bridge M or N reaches a substantially horizontal position, as shown in Fig. 1, the forward end of the sheet will have been brought by the delivery-tapes d^6 up against the stops *o*. During further movement of the carrier and tapes the sheet is carried along by the tapes d^6 at a speed sufficient to keep the forward end against the stops *o* until sufficient number of the bridges M or N have come into horizontal position to support and carry the sheet. The sheet is carried by the endless carrier until the forward end thereof reaches the stops *p'*, when its motion is stopped and the bridges M or N slide out beneath the sheet and allow it to drop into the box below, the stop *p* being, as previously stated, arranged so that the sheets will fall down into the box in a neat pile at the point desired.

While I have shown an endless carrier moving in one direction, I do not desire to limit myself to such construction or motion, the essential feature of my sheet carrying and piling mechanism consisting in a carrier which supports and carries the sheet until the sheet is in position to fall within the piling-box and then withdraws from beneath the sheet, allowing it to fall within the piling-box.

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

1. A sheet carrying and piling mechanism for printing-presses, comprising a receptacle for the pile of sheets, a movable carrier and a stop for preventing further forward longitudinal movement of the sheet by the carrier when the sheet has reached the desired position over the pile-receptacle, and means for sliding the carrier from beneath the sheet.

2. A sheet carrying and piling mechanism for printing-presses, comprising a receptacle for the pile of sheets, a movable carrier and a stop for preventing further forward longitudinal movement of the sheet when it has reached the desired position over the pile-receptacle, and means for sliding the carrier from beneath the sheet by a continued forward movement of the carrier.

3. A sheet carrying and piling mechanism for printing-presses, comprising a receptacle for the pile of sheets, an endless movable carrier, a stop for preventing longitudinal movement of the sheet when it has reached the desired position over the pile-receptacle, whereby that portion of the carrier supporting the sheet upon the continued motion of the carrier will slide out from beneath the sheet and allow it to fall within the pile-receptacle.

4. A sheet carrying and piling mechanism for printing-presses, comprising two parallel strips, bridges connecting said strips, a stop for preventing longitudinal movement of the sheet carried by said carrier whereby upon the movement of the carrier after the edge of the sheet contacts with the stop, said bridges will slide from beneath the sheet and allow it to fall within the pile-receptacle.

5. In a sheet carrying and piling mechanism for printing-presses, a carrier comprising two flexible strips, bridges connecting said strips, means for bringing said bridges into a substantial horizontal plane upon motion of the carrier, a stop for preventing longitudinal movement of the sheet, whereby when the sheet contacts with the said stop upon further movement of the carrier the bridges will pass from beneath the sheet and allow it to fall within the pile-receptacle.

6. In a sheet carrying and piling mechanism for printing-presses, a carrier comprising two parallel endless strips, bridges connecting said strips, means for bringing said bridges upon movement of the carrier into a substantial horizontal plane, a stop for limiting the longitudinal movement of the sheet, whereby when the sheet contacts with the stop the bridges will slide out from beneath the sheet and allow it to fall within the pile-receptacle.

7. In a sheet carrying and piling mechanism for printing-presses, a carrier comprising two parallel, endless chains, bridges connecting said chains and each consisting of a shaft with a series of flat sheet-supporting arms, means for moving said shafts so as to bring said flat arms into a substantially horizontal plane while supporting the sheet.

8. In a sheet carrying and piling mechanism for printing-presses, a carrier comprising two parallel endless chains, bridges connecting said chains, each of said bridges consisting of a shaft and a series of flat supporting-arms, arms rigidly connected to and projecting from each of said shafts and provided with pins, a cam-groove in the support for said carrier cooperating with said pins, whereby upon the movement of the carrier the said bridges are brought into a substantially horizontal plane to support and carry the sheet.

9. A printing-press, comprising in combination a sheet-delivery mechanism, an endless, flexible sheet-carrying mechanism pro-

vided with a plurality of series of sheet-supporting bridges, stops at one end of each of said series of bridges to aline and position the sheet as it is received from the sheet-delivery mechanism.

10. In a printing-press, a sheet-delivery mechanism, a sheet carrying and piling mechanism comprising an endless movable carrier provided with stops to prevent further longitudinal movement of the sheet after it is in position over the pile-receptacle, whereby upon further movement of the carrier it will pass from beneath the sheet and allow the sheet to fall within the pile-receptacle.

11. A sheet-carrying mechanism for printing-presses, comprising two endless chains, bridges connecting said chains, each bridge comprising a shaft, the link-pins of said chains being extended and each of said shafts being recessed at one end to fit over the link-pins of one chain and at the other end provided with a projecting arm rigidly attached thereto and recessed to fit over the link-pins of the other chain, said projecting arm having a roll at its end, a cam-groove in the support for said carrier coöperating with said roll.

12. A printing-press, comprising in combination an impression-cylinder, a sheet-delivery mechanism, means for reducing the speed of the sheet carried by the sheet-delivery mechanism, a sheet carrying and piling mechanism comprising a movable carrier, a stop for preventing longitudinal movement of the sheet whereby upon further movement of the carrier it will slide from beneath the sheet and allow the same to fall within the pile-receptacle.

13. The combination of printing mechanism, means for delivering the sheets from the printing mechanism to a sheet carrying and piling mechanism, said sheet carrying and piling mechanism comprising a receptacle for the pile of sheets, a movable carrier, and a stop for preventing further forward longitudinal movement of the sheet by the carrier when the sheet has reached the desired position over the pile-receptacle, and means for sliding the carrier from beneath the sheet.

14. The combination of printing mechanism, means for delivering the sheets from the printing mechanism to a sheet carrying and piling mechanism, said sheet carrying and piling mechanism comprising a receptacle for the pile of sheets, a movable carrier, and a stop for preventing further forward longitudinal movement of the sheet when it has reached the desired position over the pile-receptacle, and means for sliding the carrier from beneath the sheet, by a continued forward movement of the carrier.

15. The combination of printing mechanism, means for delivering the sheets from the printing mechanism to a sheet carrying and piling mechanism, said sheet carrying and piling mechanism comprising a receptacle for the pile of sheets, an endless movable carrier, a stop for preventing longitudinal movement of the sheet when it has reached the desired position over the pile-receptacle, whereby that portion of the carrier supporting the sheet upon the continued motion of the carrier will slide out from beneath the sheet and allow it to fall within the pile-receptacle.

16. The combination of printing mechanism, means for delivering the sheets from the printing mechanism to a sheet carrying and piling mechanism, said sheet carrying and piling mechanism comprising two parallel strips, bridges connecting said strips, a stop for preventing longitudinal movement of the sheet carried by said carrier whereby upon the movement of the carrier after the edge of the sheet contacts with the stop, said bridges will slide from beneath the sheet and allow it to fall within the pile-receptacle.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIS K. HODGMAN.

Witnesses:
FREDK. M. ATWOOD,
SAML. L. HODGMAN.