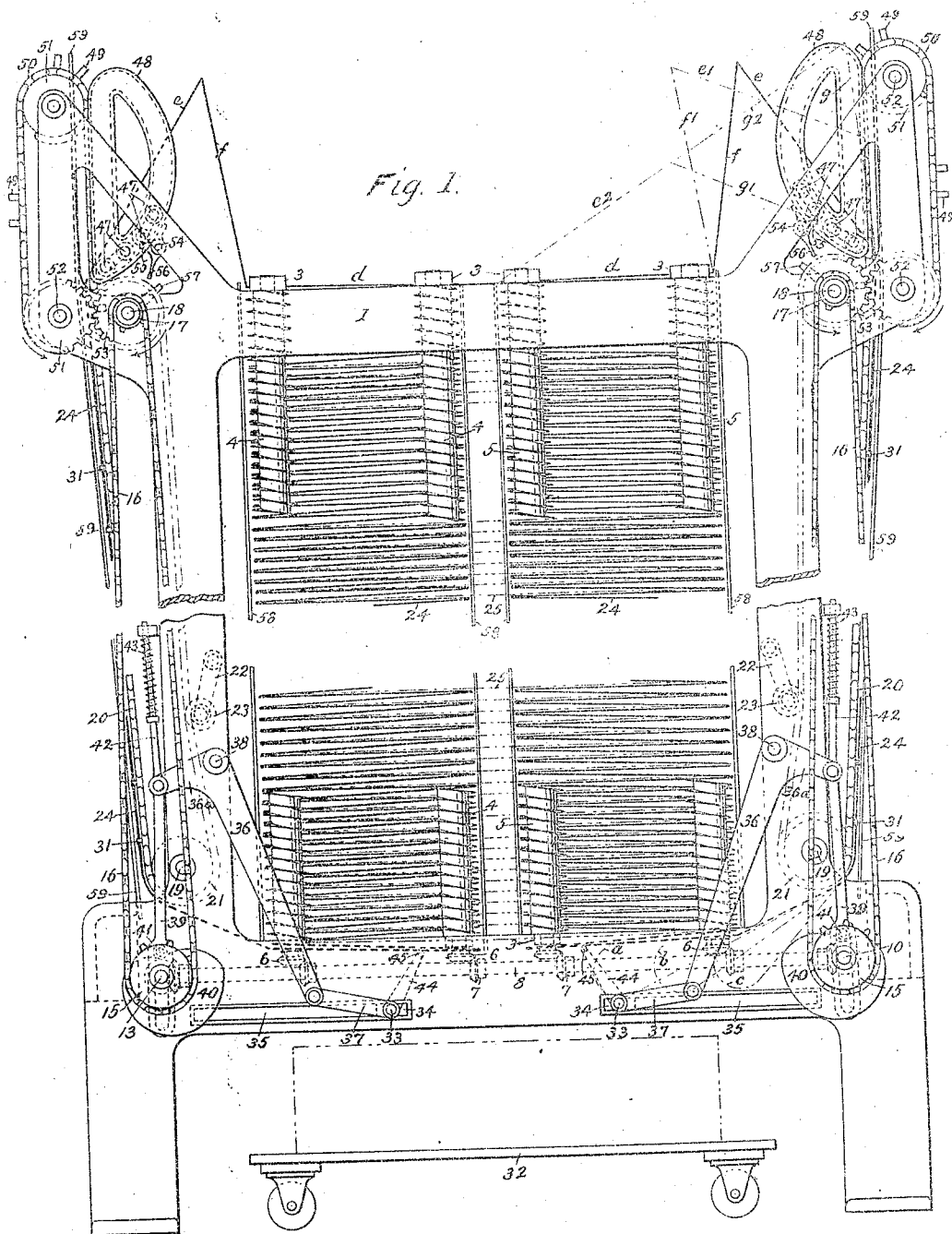


F. M. TURCK.
SLIP SHEET MACHINE FOR PRINTING PRESSES.
APPLICATION FILED NOV. 12, 1913.

Patented Aug. 18, 1914.
2 SHEETS-SHEET 1.

1,107,556.



Witnesses:
F. Martell
A. Kelper

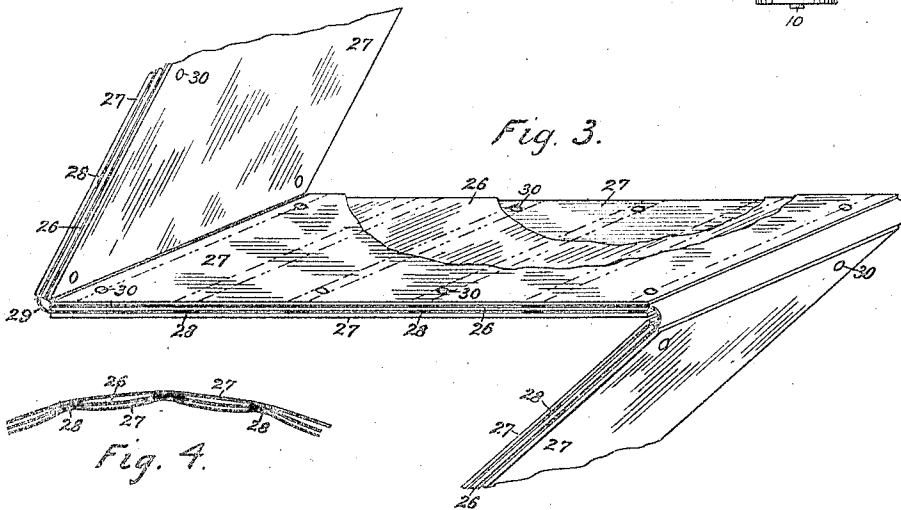
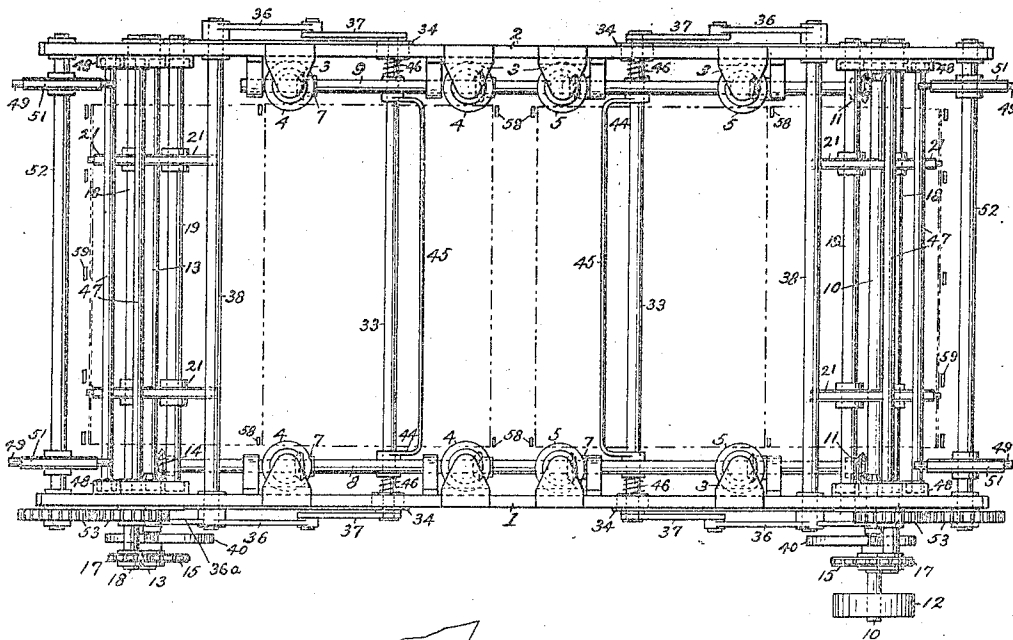
Inventor
Frederick M. Turck.
By his Attorney Wm. Dodge

F. M. TURCK.
SLIP SHEET MACHINE FOR PRINTING PRESSES.
APPLICATION FILED NOV. 12, 1913.

1,107,556.

Patented Aug. 18, 1914.

2 SHEETS-SHEET 2.



Witnesses:
A. Martell
A. Kelfer

Inventor
Frederick M. Turck.
By his Attorney Wm Dodge

UNITED STATES PATENT OFFICE.

FREDERICK M. TURCK, OF NEW YORK, N. Y.

SLIP-SHEET MACHINE FOR PRINTING-PRESSES.

1,107,556.

Specification of Letters Patent.

Patented Aug. 18, 1914.

Application filed November 12, 1913. Serial No. 800,523.

To all whom it may concern:

Be it known that I, FREDERICK M. TURCK, a citizen of the United States, and resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Slip-Sheet Machines for Printing-Presses, of which the following is a specification.

The invention relates to improvements in slip-sheet machines for printing presses, in which the printed sheets delivered from the press are automatically received and separably held in transit by a folded slip-sheet web for a sufficient time to afford the necessary drying action of the ink. Ordinarily, in machines of this class the folded slip-sheets and printed sheets are laid in contact upon one another, and where the number of piled sheets and aggregate weight thereof are considerable, much difficulty is experienced both in effecting rapid drying and in the prevention of offset.

The objects of the present invention are to provide a slip-sheet web foldable in a zigzag manner into a series of sheet-supporting sections and cover sections, in which the several sections are so constructed as to normally present a plane surface under working conditions, and after being bent over itself, in the act of unfolding, to possess sufficient elasticity to again assume its normal plane condition.

A further object provides for propelling the folded web sections in spaced relation with one another, for the support of the printed sheets in transit, to effect a more rapid drying action thereon and the prevention of offset. And the invention also includes means for unfolding the web sections for the delivery of the dried sheets, and for advancing and positioning the unfolded web to effect under the influence of gravity an overfolding action of the sections thereof for the reception of the printed sheets.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, and wherein like characters are used to designate corresponding parts throughout the several views, and in which:

Figure 1 is a side elevation of the machine embodying the present invention, parts thereof being broken to indicate a contraction in the height thereof; Fig. 2. a ground plan of the same in which the slip-

sheet web is indicated by broken lines; Fig. 3 is an enlarged detail perspective view of the sections of the slip-sheet web; and Fig. 4 is an edge view of a bent fragmental portion of the latter.

In the drawings, numerals 1 and 2 designate respectively the front and rear main frames of the machine, connected in the usual manner by cross-braces. Fixed upon the interior of the opposite frames, are bearings 3, in which are rotatably supported a double series of screw-conveyers 4 and 5, having at their lower ends bevel driving gears 6, engaged by corresponding gears 7, fixed to the shafts 8 and 9, which in turn are driven from the main cross-shaft 10 by the double set of bevel gears 11, the latter shaft being journaled in the main frames and provided with the power pulley 12, all more clearly indicated in Fig. 2. Also journaled in the main frames is a second cross-shaft 13, receiving its motion from shaft 8 and the set of bevel gears 14. Upon the front ends of shafts 10 and 13 are fixed the sprocket wheels 15, which by means of the chains 16 and the upper wheels 17 serve to rotate the upper cross-shafts 18, which transmits motion to the lower cross-shafts 19 by means of the chains 20 and wheels 21, these upper and lower shafts being journaled in the main frames and constituting the head and foot shafts of the vertical chain drivers 20. Swing arms 22 having idler wheels 23 engaging the chains 20 serve to adjust the tension of the latter upon their respective wheels.

The machine as herein disclosed is provided with a double set of oppositely-disposed endless slip-sheet webs 24, each folded transversely in a zigzag manner to form supporting sections and cover sections for printed sheets of considerable size, indicated by the broken lines 25.

The web sections, as shown in the enlarged detail views Figs. 3 and 4 are made of three sheets of material, preferably of thin tough paper, consisting of a central member 26 and the outer or facing members 27, connected by the spaced lines of adhesive 28, extending transversely of the webs, the several web sections being hingedly connected together by strips of fabric 29, adhesively secured between the members of the sections as shown. To overcome the natural curling action of the individual members under the

influence of the atmosphere, and to provide elasticity for the assembled web members, the fiber-grain of the central member is disposed transversely of the web, while that of the facing members is positioned longitudinally thereof. By thus arranging the fibers of the members, not only will the assembled members tend to present a substantially plane and strong surface for the reception of the work, but when the sections are bent during the act of unfolding, as shown in Fig. 4, the fiber stresses in the opposite members will cause a bulging or separating action of the connected sheets between the line of adhesive on the concave side of the bend, inducing counteracting forces tending to return the section to its normally plane condition when released. For advancing the unfolded web sections each thereof is provided with eyelets 30, adapted to be engaged by the pins 31, fixed in suitable position upon the chain drivers 20.

For supporting the folded web sections in spaced relation with one another and propelling the same in a downward direction, the screw-conveyers 4 and 5 are employed, the spiral threads of which are positioned to present the supporting sections of the oppositely disposed slip-sheet webs in substantially horizontal planes for receiving and holding the printed sheets. At their upper ends the threads of the screw-conveyers are provided with an increased outward flare to afford a clear entrance for the overfolded web-sections, at which point the printed sheets are received from the press by means of any approved press-delivery mechanism, preferably including a projecting reciprocatory sheet-gripper bar timed with respect to the slip-sheet machine.

At the lower or delivery end of the machine, the joint unfolding action of the oppositely disposed slip-sheet webs allows the printed sheets to fall by gravity upon the table 32, the latter being preferably provided with casters for convenience in handling the delivered sheets. For controlling the unfolding movements of the webs, cross-bars 33 are employed, having terminal blocks 34, slidably mounted in slots 35, formed in the front and rear frames, the blocks being connected on opposite sides of the machine to the levers 36 by the links 37. Cross-shafts 38, mounted for rocking movement in the opposite frames, secure the opposite levers in fixed relation with each other, the levers on the front side of the machine being provided with the arms 36^a, to which is pivotally connected one end of the cam-rods 39, the opposite end being slotted for engaging the shafts 10 and 13, which latter are provided with cams 40, engaging rollers 41, mounted upon the rods, the rollers being indicated in dotted lines.

By the rotation of the cams 40, the cross-bars 33 are positively driven in the direction of the unfolding movement of the web sections, and for the return movement of the cross-bars, spring rods 42 are employed, the latter being pivotally connected to the arms 36^a and provided with springs 43, which serve to maintain operating connection with the cams for the movement of the cross-bars in opposite directions. Loosely mounted upon the latter by the arms 44 are the tension-rods 45, extending across the machine and transversely engaging the webs. Short coil springs 46 encircle the cross-bars 33 and are arranged in connection with the arms 44 to yieldingly urge the tension-rods in contact with the unfolding slip-sheet webs to control the path of the latter for effecting an even delivery of the sheets with the respect to the oppositely-disposed supporting sections. In the act of delivering the sheets, the lowermost folded sections of the opposite slip-sheet webs fall by gravity from the free lower thread-ends of the rotating screw conveyers upon the tension-rods 45, as shown, and in the continued movement of the webs, as imparted by the drive-chains 20, they will be unfolded by bending action in the manner indicated in the several positions by the broken lines, *a*, *b* and *c*, the extent of the bending action being regulated by the laterally yielding and horizontally movable tension-rods 45 and the connected cross-bars 33.

In conjunction with the unfolding movement of the web sections, a corresponding overfolding action is effected at the upper or receiving end of the machine by the continuous movement of the drive-chains 20, which serve to advance the unfolded webs and project the sections thereof into such positions as to cause them to fall by gravity and automatically fold. To more effectively control this overfolding movement, means are provided to prevent the premature bending or buckling action of the web sections consisting of a series of carrier-bars 47, which extend across the machine and transversely engage the advancing web sections. The carrier-bars are connected together in pairs and provided with terminal rollers engaging the raceways 48, secured to the opposite frames. An upward movement, corresponding in speed with that of the advancing web, is imparted to the carrier-bars by the drive-pins 49, fixed to the carrier-chains 50, which are mounted upon the wheels 51, secured to the cross-shafts 52, which latter are mounted for rotation in the opposite main frames and driven by the spur-gears 53 from the cross-shafts 18. In the movement of the carrier-chains, the pins thereon severally engage the carrier-bars 47 and elevate them from the bottom to the top of the vertical portion of the raceways,

around the upper bends of which they are forced and downwardly return by gravity by way of the curved positions thereof. Two sets of carrier-bars are employed for each web, one set thereof being arranged for an upward movement while the other set is descending; the latter movement being regulated by trips 54, pivoted to the opposite raceways and each provided with arms 55 and 56, the former arms engaging the opposite ends of the downwardly advancing carrier-bar of each pair to arrest its movement and suitably position the same with respect to its clearance with the preceding pair of carrier-bars and timely engagement by the drive-pins 49. To effect the latter engagement, the arms 56 of the trips are engaged by the dogs 57, suitably positioned upon opposite ends of the cross-shafts 18, so that at each revolution of the latter the trips are disengaged from the carrier-bars.

As shown herein, the cross-shafts 18 and 52, carrying respectively the drive-chains and carrier-bar chains, are proportioned to make one revolution for the advancement of each web section, or two revolutions for a complete overfolding of a carrier section and a cover section of the web, which double rotation corresponds with one revolution of the cross-shaft 13, actuating the delivery mechanism of the machine. For illustrating more clearly the overfolding action of the web sections, several positions thereof are shown in broken lines. The uppermost folded carrier sections *d* are represented as having fallen by gravity upon the top threads of the screw conveyers and in position to receive a printed sheet, and *e* and *f* designate respectively the corresponding positions of the next following carrier sections and cover sections of the webs. In the advancement of the web a half-section length, *e* and *f* respectively assume the positions *e*¹ and *f*¹, the next following section being maintained in a vertical path by the coincident movement of the carrier-bar 47, which continues thus to control the section for its full upward advancement to the position *g*, at which position the carrier-bars are driven over the upper bend of the raceway for the release of the web section, allowing the latter to fall to the position *g*¹, section *e*¹ to position *e*² and *f*¹, the cover section, to fall and overfold upon the advancing threads of the screw-conveyers. In its advancement, the next following section of the web will likewise be vertically sustained temporarily by the carrier-bars, and section *d* carried to the position *g*², and upon the release of the carrier-bar the new section will fall into the position formerly occupied by the preceding carrier section *e*, section *g*² into that previously occupied by cover section *f*, and section *e*² will overfold upon the

previously folded section *f*, and constitute a new carrier section. It will thus be obvious that the succeeding web sections may be readily overfolded upon the threads of the screw-conveyer and retained in separated relation thereby for the reception and retention of the printed sheets, the lateral position of the folded sections being maintained throughout the height of the machine by the fixed vertical guide-bars 58, suitably supported and positioned to receive the thrust of the web sections during their unfolding and overfolding movements. Vertically-extending guide-bars 59 are also conveniently spaced in fixed relation adjacent the drive-chains 20 and carrier-bars 47, and serve to laterally support the unfolded webs for effecting the driving action thereof.

While I have shown and described the preferred construction of the slip-sheet webs, it will be evident that the number of members comprising a section and the material thereof may be varied, and the direction of the fiber-lines of the opposing members transposed; and the spaced connection lines formed by stapling or otherwise, without departing from the principle of the invention. Also, when the printed sheets are comparatively small, as supplied by a relatively small printing press, one folded slip-sheet web may be used in place of the double set of webs set forth, the latter being preferably employed in the larger machines, as allowing of smaller sections, offering less resistance and consequent greater durability and increased working speed. In exceptionally large machines additional transverse reinforcing bars may be secured to the sections adjacent the hinge members.

What I claim as my invention and desire to secure by Letters Patent, is:

1. An endless flexible slip-sheet web foldable transversely in a zigzag manner and comprising a series of hingedly connected sheet-supporting sections and cover sections, each thereof consisting of a plurality of flexible sheet members connected together by spaced lines of adhesive extending transversely of said web.

2. An endless flexible slip-sheet web foldable transversely in a zigzag manner and comprising a series of hingedly connected sheet-supporting sections and cover sections, each thereof consisting of a central flexible sheet member and flexible-sheet facing members disposed on opposite sides of said central member and secured thereto by spaced lines of adhesive extending transversely of said web.

3. An endless flexible slip-sheet web foldable transversely in a zigzag manner and comprising a series of hingedly connected sheet-supporting sections and cover sections, each thereof consisting of a central member

of paper having its fiber-grain extending transversely of said web, and paper facing members disposed on opposite sides of said central member and having its fiber-grain extending longitudinally of said web and connected to said central member by spaced lines of adhesive extending transversely of said web.

4. An endless flexible slip-sheet web foldable transversely in a zigzag manner and comprising a series of sheet-supporting sections and cover sections, each thereof consisting of a central member formed of paper having its fiber-grain extending transversely of said web, fabric hinge sections connecting said series of central members, and paper facing members disposed on opposite sides of said central members and having its fiber-grain extending longitudinally of said web and connected to said central members by spaced lines of adhesive extending transversely of said web.

5. An endless flexible slip-sheet web foldable transversely in a zigzag manner and comprising a series of hingedly connected sheet-supporting sections and cover sections, and eyelets formed in each of said sections.

6. A slip-sheet machine comprising an endless flexible slip-sheet web foldable transversely in a zigzag manner and forming a series of hingedly connected sheet-supporting sections and cover sections, means for advancing said web and overfolding said sections by gravity for the reception of the printed sheets and means for unfolding said sections for the delivery of said sheets.

7. A slip-sheet machine comprising an endless flexible slip-sheet web foldable transversely in a zigzag manner and forming a series of hingedly connected sheet-supporting sections and cover sections, means for advancing said web and overfolding said sections by gravity for the reception of the printed sheets, means for supporting and propelling said folded web sections in spaced relation with one another, and means for unfolding said sections for the delivery of said sheets.

8. A slip-sheet machine comprising an endless flexible slip-sheet web foldable transversely in a zigzag manner and forming a series of hingedly connected sheet-supporting sections and cover sections, means for supporting and propelling the folded web sections in spaced relation with one another, means for presenting the supporting sections for the reception of printed sheets, means for overfolding said cover sections at the receiving end of the machine, and means for unfolding said sections for the delivery of said printed sheets.

9. A slip-sheet machine comprising a pair of endless flexible slip-sheet webs foldable transversely in a zigzag manner and oppositely disposed with respect to each other, said webs comprising a double series of hingedly connected sheet-supporting sections and cover sections, means for supporting and propelling the folded sections of each web in spaced relation with one another, means for presenting said supporting sections of the opposite webs in horizontal line with one another for the reception of printed sheets, means for overfolding said cover sections at the receiving end of the machine, and means for unfolding said sections for the delivery of said printed sheets.

10. A slip-sheet machine comprising an endless flexible slip-sheet web foldable transversely in a zigzag manner and comprising a series of hingedly connected sheet-supporting sections and cover sections, eyelets formed in said web sections, means for supporting and propelling the folded web sections in spaced relation with one another, and driving means engaging said eyelets for advancing said web to unfold and overfold said web sections at the delivery and the receiving ends of the machine respectively.

11. A slip-sheet machine comprising an endless flexible slip-sheet web foldable transversely in a zigzag manner and comprising a series of hingedly connected sheet-supporting sections and cover sections, means comprising a series of rotatable screw conveyers for supporting and propelling the folded web sections in spaced relation with one another, and means for unfolding and overfolding said web sections at the delivery and receiving ends of the machine respectively.

12. A slip-sheet machine comprising an endless flexible slip-sheet web foldable transversely in a zigzag manner and comprising a series of hingedly connected sheet-supporting sections and cover sections, means for supporting and propelling the folded web sections in spaced relation with one another, means for overfolding said sections at the receiving end of the machine, and means including a slidable yielding web-engaging tension bar for unfolding said sections at the delivery end of the machine.

Signed at New York, in the county of New York and State of New York this 10th day of November A. D. 1913.

FREDERICK M. TURCK.

Witnesses:

CHAS. W. LE RUE,
W. H. HUSTED.