H. L. LEILICH & J. P. BURGER.

SHEET DELIVERY MEANS.

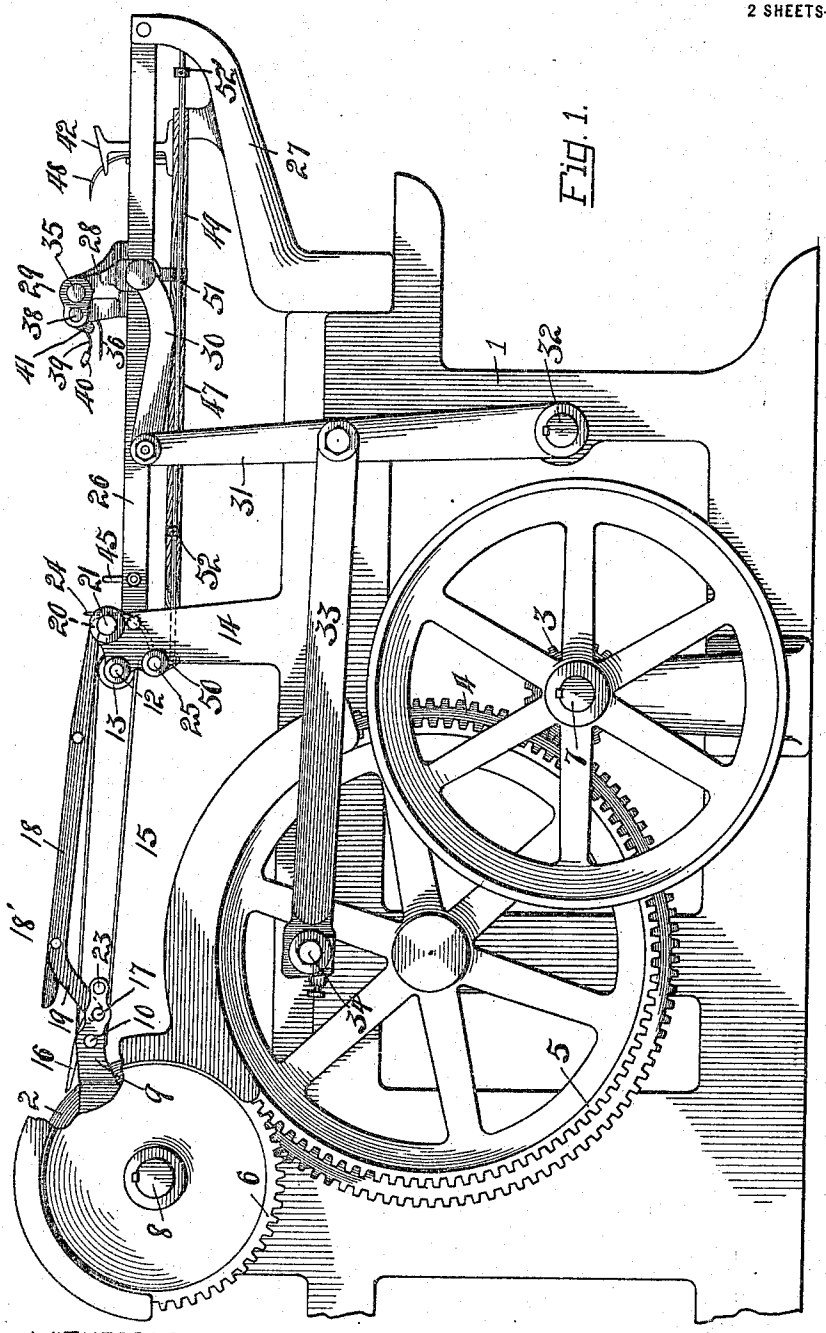
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1,228,933.

Patented June 5, 1917.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

R. G. Allen.

F. C. Aul.

INVENTOR.

John P. Burger,

Henry L. Leilich

By Burton & Owen,

Their attys.

E. NORRIS PET. .RS CO., PHOTO-LITHO., WASHINGTON, D. C.

H. L. LEILICH & J. P. BURGER.

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2 SHEETS—SHEET 2.

Fig. 2.

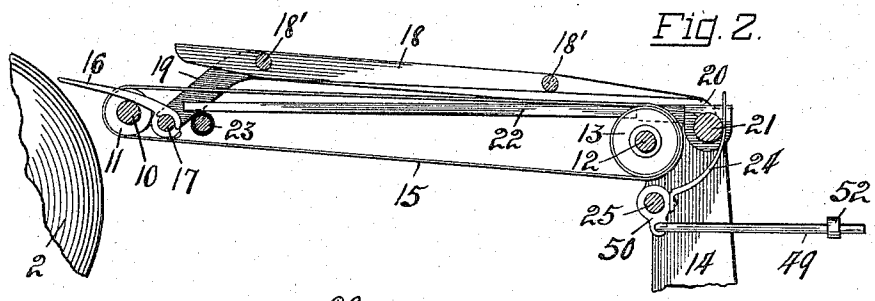


Fig. 3.

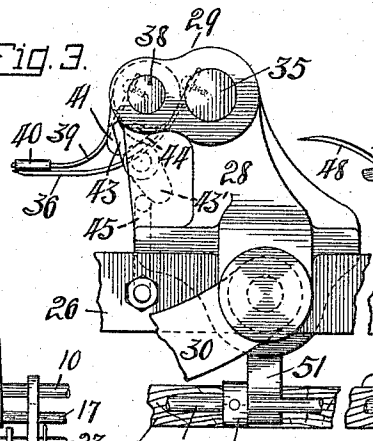
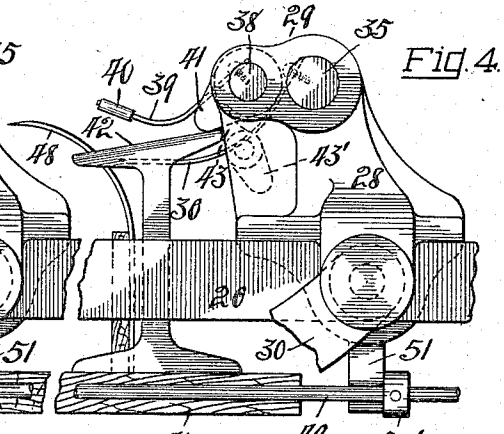


Fig. 4.



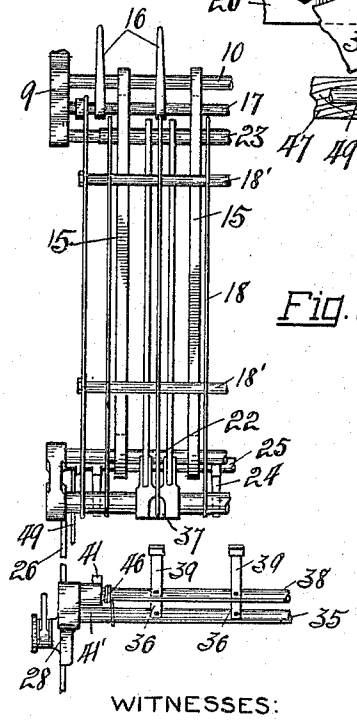


Fig. 6.

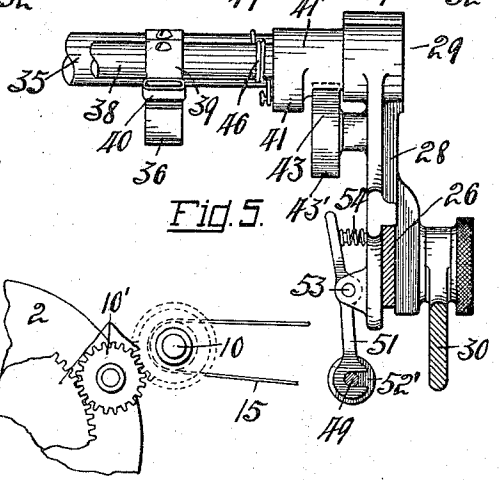


Fig. 5.

Fig. 7

WITNESSES:

R. G. Allen.

F. E. Ault.

INVENTOR.

John P. Burger,

Henry L. Leilich,

By Owen & Owen.

Their attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HENRY L. LEILICH AND JOHN P. BURGER, OF DELPHOS, OHIO, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE DELPHOS PRINTING PRESS COMPANY, OF DELPHOS, OHIO, A CORPORATION OF OHIO.

SHEET-DELIVERY MEANS.

1,228,933. Specification of Letters Patent. Patented June 5, 1917.

Application filed September 24, 1913. Serial No. 791,515.

To all whom it may concern:

Be it known that we, HENRY L. LEILICH and JOHN P. BURGER, citizens of the United States, and residents of Delphos, in the county of Allen and State of Ohio, have invented a certain new and useful Sheet-Delivery Means; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates particularly to sheet delivery means for printing presses of the cylinder type, but is not restricted to such use as it may be used in any connection for which it may be adapted or appropriate.

The object of our invention is the provision of improved reciprocally operable means of this character whereby to enhance the efficiency, practicability and commercial value of apparatus of this class.

The invention is fully described in the following specification, and while, in its broader aspect, it is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a side elevation of a press embodying the invention, with parts broken away and parts removed. Fig. 2 is an enlarged longitudinal vertical section of a portion of the sheet guiding and delivery mechanism. Figs. 3 and 4 are enlarged side elevations of a portion of the delivery mechanism with the sheet delivery slide in different positions of its movement. Fig. 5 is an enlarged front sectional detail of an end portion of said mechanism. Fig. 6 is a plan view of a side elevation of the mechanism with parts broken away, and Fig. 7 is an end elevation of a portion of the tape driving means.

Referring to the drawings, 1 designates the frame of a printing press, 2 the impression cylinder, and 3, 4, 5 and 6 a train of gears for communicating rotation from a drive shaft 7 to the cylinder shaft 8, which parts are customarily present in one arrangement or another in presses of this character.

Projecting forward from the frame 1 at each side of the cylinder 2 in adjacent relation thereto is an arm 9 forming a bearing for the end of a tape shaft 10, which shaft is driven from the cylinder shaft 8 through a train of gears 10′ and has a plurality of spaced tape disks or wheels 11 mounted in suitably spaced relation thereon. A similar shaft 12 with tape disks or wheels 13 thereon is journaled at its ends in standards 14 rising from the respective sides of the frame 1 and connecting the registering wheels of these shafts are endless tapes 15, which guide and feed the sheets forward as they pass thereon from the cylinder 2. Fingers 16 project rearwardly over the shaft 10 from a shaft or rod 17 that is mounted at its ends in the respective arms 9 and serve to guide the course of the sheets from the cylinder to the delivery tapes 15.

A guide frame 18 superimposes the tapes 15 in spaced relation thereto to hold the sheets to the tapes as they pass thereover. The frame 18 is preferably composed of a plurality of longitudinally-extending bars which are rigidly connected in laterally spaced relation by cross-bolts or rods 18′. Each of the side bars of the frame 18 is provided at its rear and forward ends with feet 19 and 20, respectively, the former of which loosely rest upon a shaft 21, which is carried by the frame standards 14 in advance of the shaft 12. The frame 18 is preferably so arranged with relation to the belts 15 that the opening or space therebetween gradually broadens from the forward to the rear end thereof.

22 designates the customary sheet delivering fly, the arms of which project from the shaft 21 and, when in lowered or inoperative position rest at their forward ends upon a bar 23, which connects the forward ends of the frame arms 9. When our improved delivery mechanism is being used the fly 22 may rest in the reclining inoperative position shown in Fig. 2, in which position the inner ends of the fly arms extend forwardly from the top surface plane of the tapes 15 to guide the forward ends of the sheets as they feed forward over the shaft 12. If it is desired to use the fly 22 to deliver the sheets from the tapes 15 the frame 18 is removed from over the tapes and the

fly shaft 21 connected to the usual operating mechanism. As this mechanism forms no part of the present invention the same is not shown. The advance of the sheets over the tapes 15 is stopped at a predetermined point by the stop fingers 24, which project from a rock-shaft 25 in position to extend upward immediately in advance of the shaft 21 in sheet obstructing position when the shaft 25 is in one position of its rocking movement. The means employed for the timely rocking of the shaft 25 will be hereafter described.

A guide-bar 26 extends forward from each side standard 14 and is attached at its outer end to a standard 27 of the press frame. Each end 28 of the slide-frame 29 is mounted for reciprocatory sliding movements on the respective guide-bars 26 and each of such ends is connected by a link 30 to an upstanding rocker-arm 31, which is pivoted, as at 32, to the adjacent press frame side and has connection intermediate its ends to a bar 33 with a crank-pin 34 on the gear 5, thus causing the slide-frame 29 to have a complete forward and a complete backward stroke at each revolution of the gear 5.

The slide-frame 29 has a cross-bar or part 35 rigidly connecting the ends 28 thereof and projecting downward and rearward from this bar in suitably spaced relation are stationary sheet gripping fingers or jaw teeth 36, the free end portions of which are horizontally disposed and adapted to enter surface depressions 37 in the top side of the forward end portion of the fly 22 in position to project rearwardly under the forward edge of a sheet resting upon such fly. Connecting the ends 28 of the slide frame at the rear of the bar 35 is a rock-shaft 38 carrying a plurality of movable sheet gripping fingers 39 in vertical register with the fingers 36. The fingers 39 are adapted to coöperate with the fingers 36 to grip a sheet and to draw the same forward from under the frame 18 upon a forward stroke of the slide frame. The free end portions of the fingers 39 are preferably tipped with rubber or other suitable material 40 to facilitate a firm gripping of a sheet.

The rock-shaft 38 is provided at at least one end thereof with an arm 41, which, when the slide-frame 29 is near the limit of its forward stroke rides over an incline or cam surface 42 and effects a rocking of the shaft 38 in a direction to raise the fingers 40 from gripping engagement with the fingers 36. A pawl 43 is pivoted to an end 28 of the slide-frame and automatically engages against a tooth or within a notch 44 in the sleeve 41′ from which the arm 41 extends to retain the fingers 39 in raised or open position. The engaging movement of the pawl 43 with its notch is influenced, in the present instance, by gravity action due to the weight of a downwardly projecting tail piece 43′ of the pawl. When the slide frame 29 is approximately at the limit of its rearward stroke, the tail piece of the pawl 43 coacts with a standard or member 45 rising from the associated guide bar 26 and effects a tripping of the pawl from engagement with the notch 44, thus permitting the fingers 39 to lower into sheet gripping engagement with the fingers 36, which latter fingers then project at their free ends into the recesses 37 below the forward edge of a sheet. The fingers 39 are adapted to lower by gravity, and such lowering action is augmented by one or more springs 46, which encircle the shaft 38, each bearing at one end against the cross-bar 35 and at its other end against a pin projecting from the arm 41, as shown in Figs. 5 and 6.

Located between the guide bars 26, in the present instance below the horizontal plane thereof, is a table or platform 47 upon which the sheets are disposed as they are drawn forward by the fingers 36—39 and then released, such table being supported in any suitable manner by the press-frame. The standard or part forming the cam surface 42 rises from the forward end of this table near one side thereof, and upwardly and rearwardly projecting fingers 48 also rise from the forward end portion of said table in position to stop the forward movement of the sheets and to guide the descent thereof when released by the fingers 36—39. The fingers 48 alternate with the sets of fingers 36—39 to permit the latter to pass the former when the slide frame 29 is at the limit of its forward stroke.

A horizontally disposed rod 49 is mounted for reciprocatory movements at one side of the table 47 and has its rear end connected to an arm 50 projecting down from the rock-shaft 25 whereby movements of the rod will impart rocking movements to such shaft. A finger 51 projects down from the end of the slide-frame 29 adjacent to the rod 49 and is intended when near the limit of its rearward stroke with the slide-frame to engage a collar or enlargement 52 on said rod and impart a rocking movement to the shaft 25 in a direction to lower the fingers 24 from sheet obstructing position, and when near the limit of its rearward stroke is intended to engage a collar or enlargement 52′ on said rod to move the rock-shaft 25 in a direction to return the stop fingers 24 to normal sheet obstructing position. The finger 51 is pivoted, as at 52, to the inner side of the adjacent slide frame end 28 and is yieldingly held in engagement with the rod 49 by a coiled compression spring 54, which is

disposed between a portion of said frame end and the upper extended end of the finger, as shown in Fig. 5.

The operation of our improved sheet delivery mechanism is as follows: Each sheet as it is released from the impression cylinder 2 passes over the fingers 16 into the space between the tapes 15 and guide-frame 18 and is fed forward by the feeding action of said tapes until the forward edge of the sheet comes in contact with the fingers 24 standing in the path of movement thereof. The movement of the slide frame 29 is so timed that when a sheet has been fed forward over the tapes 15 the slide frame moves forward to project the stationary fingers 36 thereof under the forward edge of such sheet. When the slide frame is approximately at the limit of its rearward stroke, with the fingers under the sheet edge, the tail piece 43′ of the pawl 43 moves into contact with the finger 45, thus effecting a release of the pawl from engagement with the notch 44 and permitting the fingers 39 to lower into position to coact with the fingers 36 to grip the sheet edge. The stop fingers 24 are also moved from sheet obstructing position when the slide frame is at the limit of its forward stroke due to the action of the finger 51 with the collar 52 on the finger control rod 49. Upon the forward stroke of the slide frame the engaging sheet is drawn forward therewith over the table 47 and when the slide frame is approximately at the limit of its forward stroke the arm 41 on the rock shaft 38 rides over the incline or camming surface 42 to effect a raising of the fingers 39 from sheet gripping position, thus permitting the sheet to lower upon the subjacent table. At the same time the finger 51 engages the forward collar 52′ on the rod 49 and causes a positive return of the fingers 24 to sheet obstructing position. This operation is repeated for each sheet as it is fed over the tapes 15 from the cylinder, the movement of the slide frame 29 being properly timed with respect to the revolutions of the impression cylinder 2 for such purposes.

We wish it understood that our invention is not limited to any specific construction or arrangement of the parts except in so far as such limitations are specified in the claims.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent is,—

1. In combination, sheet feeding means, rock fingers associated with said means for obstructing the feed of sheets thereby, a member reciprocally movable in advance of said fingers and relative thereto, sheet gripping fingers carried by said member and automatically operable to grip a sheet when the member is in one position of its movement and to release a sheet when the member is in another position of its movement, and connection between said fingers and member operable to move the fingers out of sheet obstructing position when the member is in sheet gripping position and to return the fingers to sheet obstructing position when the member is in sheet releasing position.

2. In combination, feed tapes, a guide frame disposed thereover, sheet obstructing fingers associated with said tapes to obstruct the feeding of sheets thereby, slideways extending forward from said tapes, a slide frame reciprocally movable on said ways relative to said frame and fingers, means for imparting reciprocatory movements to said slide frame, stationary and movable gripping fingers carried by said slide frame and influenced to normally stand in sheet engaging position, means for locking said gripping fingers in open position, means for releasing said locking means to permit a closing of the gripping fingers when the slide frame is in one position of its movement, means for opening the gripping fingers when the slide frame is at another position of its movement, and connection between said slide frame and sheet obstructing fingers for moving such fingers from sheet obstructing position when the slide frame is in sheet gripping position and to return said fingers to sheet obstructing position when the frame is in another position of its movement.

3. In a sheet delivery mechanism, spaced sets of delivery-tape wheels, delivery-tapes connecting said sets of wheels, a bar in advance of each set of wheels, arms projecting rearwardly from the forward bar between the tapes and having their rear end portions disposed below the adjacent tape portions and a guide-frame mounted above the tapes and said arms and having portions removably resting on said bars.

4. In a sheet delivery mechanism, guide members extending in the direction of delivery of sheets, a frame slidingly carried by said members, and having spaced parallel shafts one at least being mounted for rocking movements, coöperating sets of sheet gripping fingers projecting from said shafts, means for rocking the rocker shaft at a predetermined point in a movement of said frame to move the fingers carried by said shaft to open position, means for locking said rocker shaft in rocked position, and means coacting with said locking means at a predetermined point in a movement of the frame to move it into position to permit a return of the rocker shaft and its fingers to gripping position.

5. In a sheet delivery mechanism, tape delivery means, a member disposed in advance of said means to support the forward end of

a sheet fed thereby, a rock-shaft mounted adjacent to said member, stop fingers projecting from said shaft and standing in advance of said member when the shaft is in one position, sheet delivery mechanism mounted for reciprocatory movements in advance of said member, and means automatically operable at predetermined points in the movements of said mechanism to rock said shaft to move said fingers into and out of sheet obstructing position.

6. In combination, sheet delivery means, a rock-shaft, stop-fingers carried by said shaft and movable by rocking movements thereof into and out of sheet obstructing position immediately in advance of said means, a rocker-arm on said shaft, a rod projecting forward from said arm and having spaced shoulder portions thereon, a reciprocatory sheet delivery mechanism mounted for reciprocatory movements in advance of said means, a finger pivotally carried by said mechanism and having a portion in removable engagement with said rod intermediate said shoulder portions and adapted to coact with said portions at predetermined points in the movements of said mechanism to impart predetermined rocking movements to said shaft, and means holding said finger in sliding engagement with said rod.

7. In combination, sheet feeding means, sheet obstructing members associated with said means, a rod connected to said members for causing a movement of the members out of sheet obstructing position when the rod is moved in one direction and vice versa, means operable to periodically move said rod, and means having sheet gripping parts and movable to grip a sheet at the point where its movement is obstructed by said members and then to continue the feeding movement of the sheet to delivery position.

In testimony whereof, we have hereunto signed our names to this specification in the presence of two subscribing witnesses.

HENRY L. LEILICH.
JOHN P. BURGER.

Witnesses:
MAME F. WEGER,
NELLIE WILLIAMS.

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