

No. 866,740.

PATENTED SEPT. 24, 1907.

F. P. SHARP.  
SHEET DELIVERY FOR PRINTING PRESSES.

APPLICATION FILED JUNE 26, 1906.

3 SHEETS—SHEET 1.

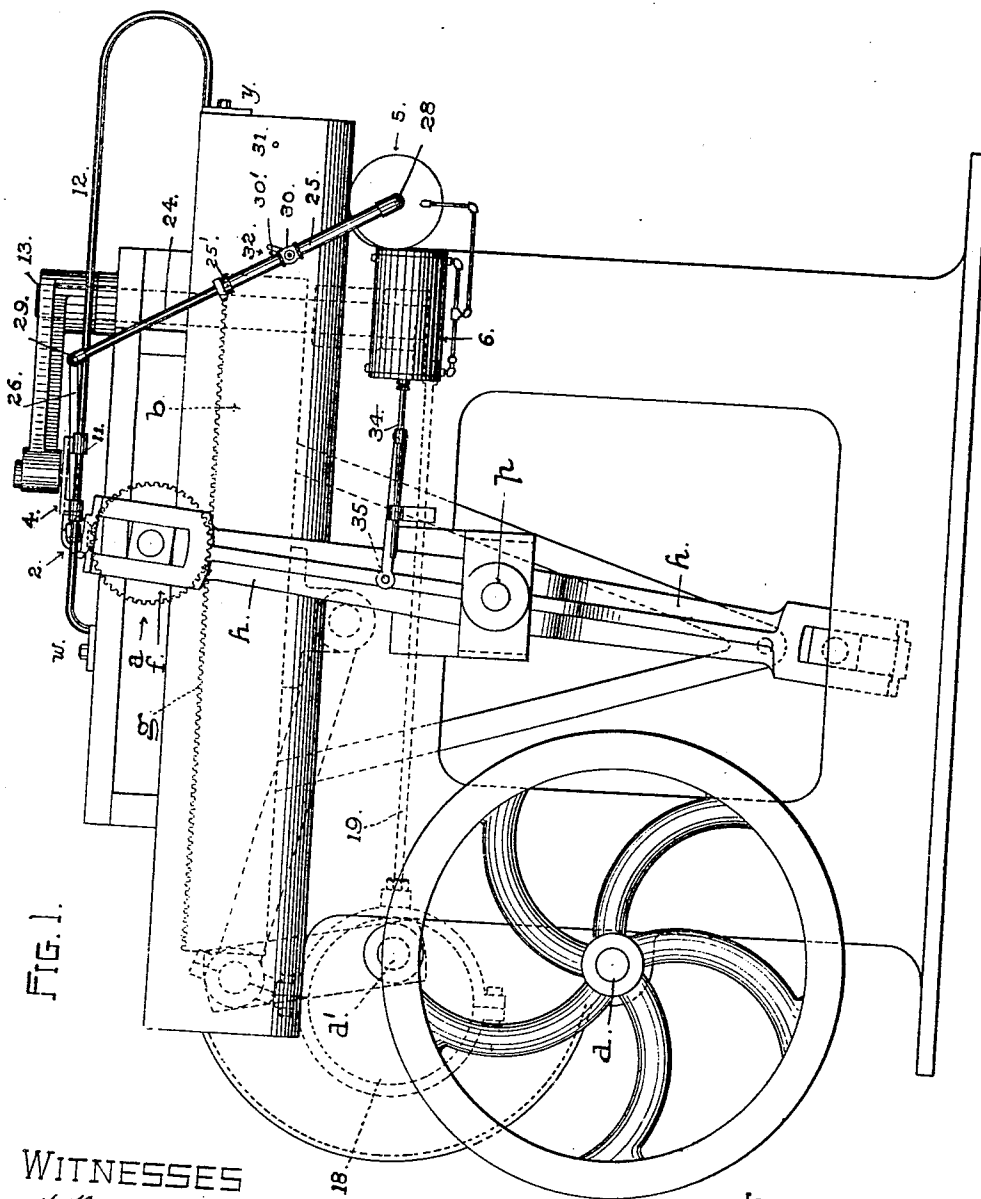


FIG. 1.

WITNESSES

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*H. L. Cloze*

INVENTOR

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by *E. E. Osborn*,  
his Attorney.

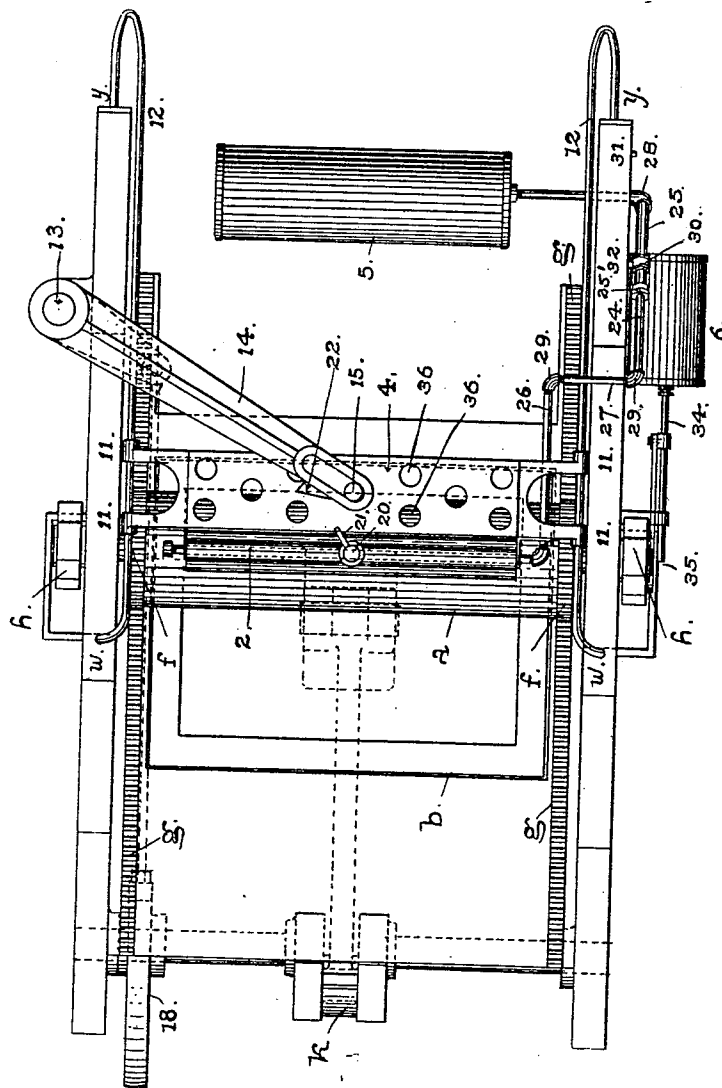
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3 SHEETS—SHEET 2.

FIG. 2.



WITNESSES

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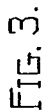
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3 SHEETS--SHEET 3.



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# UNITED STATES PATENT OFFICE.

FRANK P. SHARP, OF SAN FRANCISCO, CALIFORNIA.

## SHEET-DELIVERY FOR PRINTING-PRESSES.

No. 866,740.

Specification of Letters Patent.

Patented Sept. 24, 1907.

Application filed June 26, 1905. Serial No. 266,913.

*To all whom it may concern:*

Be it known that I, FRANK P. SHARP, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have  
5 invented new and useful Improvements in Sheet-Delivery for Printing-Presses, of which the following is a specification.

This invention relates to an improved construction of sheet delivery for a rotary-cylinder printing press,  
10 in which a reciprocating suction-head picks up the printed sheet at the moment of its release from the cylinder-grippers and delivers it to the receiving table through the operation of an air-exhausting device that alternately exhausts the air from and admits the at-  
15 mosphere to the suction-head at the proper intervals.

The invention embraces certain novel construction and combination of parts and mechanism including a reciprocating suction-head, an air-exhausting device or apparatus in which the chamber or recess in the  
20 suction-head is connected, and means actuated from the driving mechanism of the press for reciprocating the suction-head and for controlling the communication between the air-exhausting means and the suction-head, all as hereinafter more fully described and  
25 pointed out in the claims at the end of this specification.

The following description explains at length the manner in which I proceed to construct, apply and carry out the said invention, the accompanying drawings referred to therein illustrating the application of the in-  
30 vention to a printing-press of the traveling-cylinder and reciprocating bed type.

Figure 1 is a side-elevation of a sheet-delivery embodying my invention, showing the manner in which I apply the same to a printing-press having a traveling  
35 impression-cylinder and a reciprocating type-bed. Fig. 2 is a plan or top-view. Fig. 3 is a longitudinal sectional-view showing the principal parts of the press and the sheet-delivery apparatus. Fig. 4 is a detail sectional-view on an enlarged scale. Figs. 5 and 6 are views of  
40 the suction-plate removed from the suction-head.

In this description the principal parts of this sheet-delivery mechanism are designated and referred to as the suction-head 2 the suction-plate 3, the reciprocating-carrier 4, the exhaust air-tank 5 and the exhausting-  
45 pump 6.

The impression-cylinder *a* and the type-bed *b* are operated from the same shaft *d* by mechanism that drives the cylinder and the bed in opposite directions and also imparts rotary motion as well as a rectilinear  
50 movement to the cylinder.

A spur-gear *f* on the cylinder and a rack *g* on the bed produce rotary motion of the cylinder from the reciprocating movement of the bed. Oscillating levers *h h* pivotally attached to the stationary frame of the press  
55 produce reciprocating motion of the cylinder in a reverse direction to the travel of the bed through the pe-

culiar arrangement and the manner of connecting the bed and the cylinder to the levers on opposite sides of the pivotal points *p*. As this mode of driving the cylinder from the bed forms no part of the present in-  
60 vention, no detailed description of the press-mechanism proper is necessary to a clear understanding of the present invention.

The principle on which this invention is constructed to operate involves the production of a vacuum or an  
65 exhaust condition of air at intervals behind or on one side of a perforated plate which is placed against or brought in close relation to the printed sheet at the moment it is to be taken from the impression-cyl-  
70 der. Reciprocating motion being imparted to the perforated plate, causing it to travel forward and back between the impression-cylinder and the receiving-table, operates the perforated plate in proper time with the movements of the printing mechanism to  
75 bring the plate in working position over the printed sheet at the end of the printing operation; and, by virtue of the atmospheric pressure acting on the sheet, the latter is attracted to the perforated plate as the cylinder-grippers open and it remains attached to the  
80 plate while that part makes its return movement.

The proper degree of suction behind the plate is produced and maintained during the reciprocations to attract and hold the sheet to the plate for the required length of its throw through the medium of an air-exhausting apparatus operated from the press; and at  
85 proper intervals in the movement of the plate communication with the suction apparatus is cut off and the atmospheric pressure is equalized on both sides of the printed sheet to release it from the perforated plate and insure its discharge from the delivery-mech-  
90 anism.

The part which I have termed, for purpose of this description, the suction-head is constructed and operated as follows:—The head or body 2 is formed or provided with a chamber or cavity 7 connected at  
95 one end with an air-tight tank 5 by tubular conductors or connections of such character that the chamber is in communication with the air-tank at all times during the travel or throw of the head 2 forward and back. A perforated plate 3 being fixed in a dove-  
100 tailed recess in the bottom of the head 2 its perforations constitute so many apertures 3<sup>1</sup> extending longitudinally of the head through which the chamber 7 communicates with the atmosphere. The plate 3 is made separate and detachable from the suction-head  
105 2, in order to allow a plate with one size or number of perforations to be removed and another with a different arrangement of perforations to be substituted, according to the size of the sheet being run through the press, or as the conditions under which the de-  
110 livery-mechanism is working may require. As the effective operation of the atmospheric pressure at the

moment of picking up or attracting the sheet requires all the apertures in the suction-plate 3 to be covered by the sheet, provision is made in the present construction for regulating the number of the apertures, or the length of the row of such apertures, by making the suction-plate detachable, and furnishing one or more additional plates in which the row of apertures is adapted to be covered by a wider or a narrower sheet. This mode of regulating the length of the row of apertures is more simple and practical than temporarily closing several apertures at one or both ends of the suction-plate to decrease the working length of the plate according to the dimensions of the sheet being run through the press. The plate 3 is inserted and removed from the end of the suction-head, and that part is journaled in brackets 9 on the reciprocating carrier 10, so that the head may be turned over to bring the plate uppermost for conveniently substituting one plate for another.

The part termed the carrier consists of a plate 10 having bosses 11 on the ends fitted to slide on stationary guides 12 that extend over the side frames of the press from the point where the sheet is taken by the suction-head to the end where the sheet is laid on the receiving-table of the press. These guides in the press herein illustrated extend from the point *w* to the end *y* of the frame, and are formed of rods 12.

An upright rock-shaft 13 having bearings on the side of the frame carries on the upper end an arm 14 to which the carrier 10 is connected by means of a short post or stud 15 fixed in the top of the part 10 and fitted to slide in a slot 16 on the end of the arm. On the lower end of the rock-shaft 13 an arm 17 is connected with an eccentric 18 on the shaft *d* of the press through the medium of a connecting-rod and strap 19—19', by the movement of which the carrier is driven with the required length of stroke in time with the movement of the impression-cylinder. The openings indicated at 36 serve to reduce both the weight of the carrier 10 and the air-pressure against it in its reciprocating movement. At the outer ends of the carrier 10 I provide brackets 9, shown in Fig. 4, in which is rotatably mounted the suction head 2 so that the same may be turned around to expose the suction plate 3, and to remove the latter when it is desired to insert another plate, as already described.

The connection between the air-chamber in the suction-head and the air-exhausting means may be made in different ways, but the construction illustrated in the drawings affords a direct and simple connection that has the advantage of being located on the outside of the frame where it is always in sight and is readily accessible for repairs.

The tubes 24—25 united by a telescopic joint 25' form an extensible connection between the suction-head and the vacuum-tank, through which the atmosphere is exhausted from the chamber in the suction-head while the latter travels on the guides. The tube 25 is attached to the tank 5 by a flexible coupling 28 when the connection is composed of inflexible metallic tubes as herein shown, and the other member or section 24 is connected with the suction-head 3 by an angular extension 26—27' also provided with flexible couplings 29. This construction is necessary where the tank 5 is fixed on the frame and the suction-head

moves in a horizontal plane above it. It will be obvious, however, that the suction-head could be connected with the source of vacuum by a continuous flexible tube instead of the telescopic connection here shown.

Provision is made for opening and closing communication between the suction-head and the source of vacuum at proper intervals, whereby the air will be exhausted from the chamber in the head at or immediately in advance of the instant that the suction-plate is brought over the sheet at the end of the forward stroke of the head, and the vacuum will be cut off from the suction-plate at the moment when the sheet is to be released and dropped. For this purpose a cock or valve 30 is placed in the connection 24—25 which as it oscillates or moves in an arc on the flexible joint brings the arm or lever 30' of the cock alternately against two fixed stops 31—32 on the frame of the press. These stops are so arranged that the lever coming in contact with the stop 32 as the tube swings to the left will open the valve 30; and at the opposite end of the throw the lever will strike the stop 31, and shut off the communication with the vacuum-tank. A more uniform degree of vacuum is thus maintained in the tank than would be possible if the communication between the suction-head and the tank were always open.

By admitting air to the suction-head at the end of the travel away from the cylinder the printed sheet is prevented from sticking to the suction-plate and a quick delivery is insured. For that purpose an inlet-valve 20 is placed on the suction-head, held normally closed by a coiled spring on the stem of the valve, and provided with an arm or lever 21 on the stem, which by contact with a block or projection 22 on the lever 14 will open the valve momentarily and at the proper moment to admit the atmospheric pressure to the suction-chamber, when the suction-head reaches that point in its travel where the vacuum is cut off and the sheet is to be delivered.

An air-exhausting pump 6 mounted on the frame of the press and connected with the tank 5 is operated from some moving part of the driving mechanism for maintaining the required degree of vacuum in the tank 5 with which it is connected. In the press herein illustrated the piston-rod 34 of the pump 6 is connected to the lever *h* of the bed and cylinder operating mechanism at 35, and the pump is of the double-acting variety. All the parts of the delivery-mechanism are thus mounted on and operated from the movements of some parts of the press itself. It will be obvious, however, that the necessary vacuum or exhausted condition in the suction-chamber of the head could be produced and furnished directly from or by a pump, without employing a vacuum-tank in addition to the pump.

As the vacuum or suction in the suction-head is required to be set up only during the throw or travel of the head in one direction, and not in the return movement, the pump used for that purpose when the tank is dispensed with can be a single-acting pump.

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

1. In a sheet delivery for a printing press, the combination with the bed and the source of vacuum, of a pair of guide rods arranged on opposite sides of the bed, a carrier mounted to slide thereon, brackets, provided with bear-

ings, secured to the carrier, a suction head rotatably mounted in the bearings in said brackets, telescoping pipes for connecting the source of vacuum with the suction head, an oscillating arm for operating the carrier, a valve  
5 in the suction head for admitting air thereto to release and deliver a sheet, and means for operating the valve, substantially as set forth.

2. In a sheet-delivery for a printing-press, the combination of a reciprocating carrier, brackets carried thereby  
10 and provided with bearings, a suction-head rotatably mounted in said bearings and having an air-chamber, a

source of vacuum connected with said chamber, and a removable suction-plate in the head provided with apertures communicating with the said chamber.

In testimony whereof I have hereunto set my name to  
this specification in the presence of two subscribing witnesses. 15

FRANK P. SHARP.

Witnesses:

EDWARD E. OSBORN,  
M. REGNER.