

1,016,659.

B. F. UPHAM.
PRINTING PRESS.
APPLICATION FILED MAR. 3, 1911.

Patented Feb. 6, 1912.

2 SHEETS—SHEET 1.

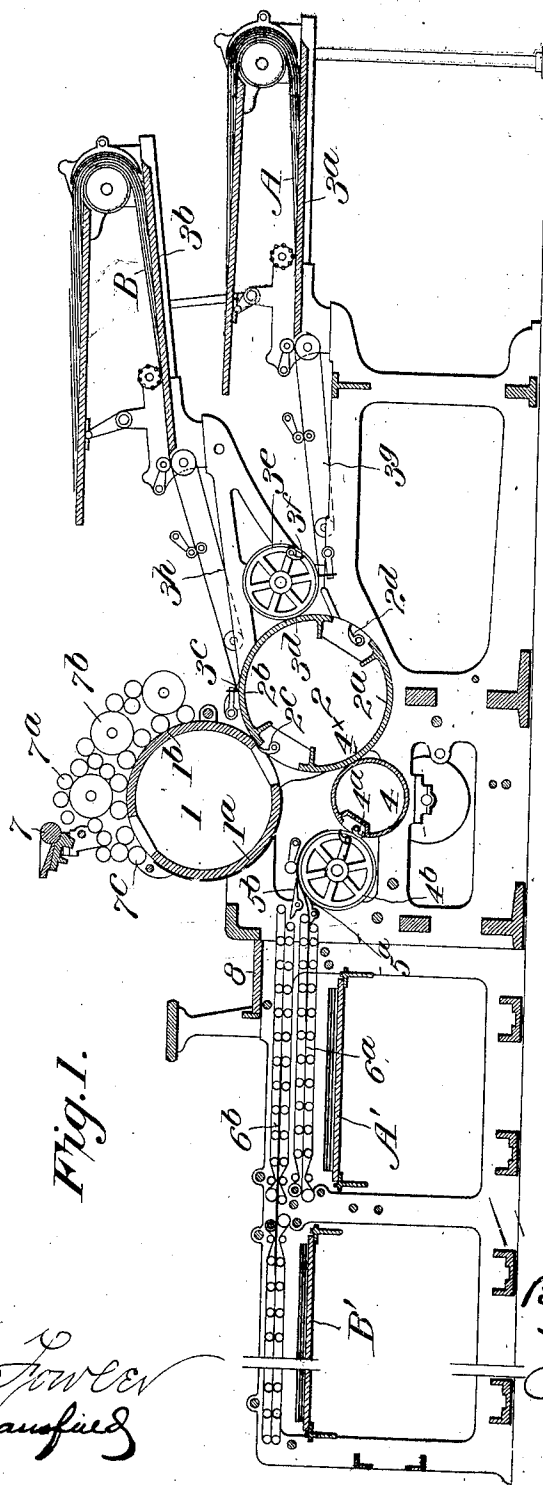


Fig. 1.

Witnesses

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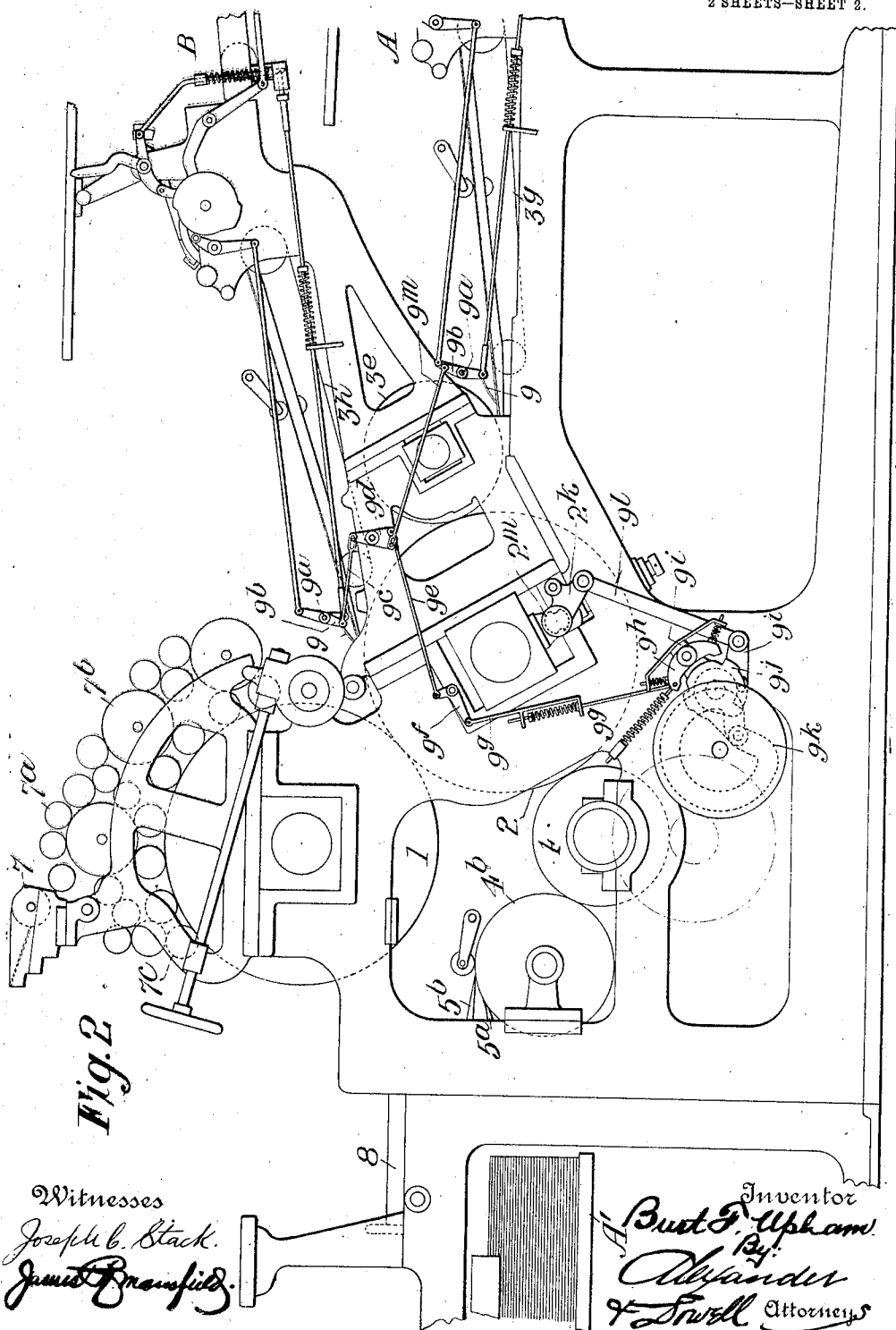


Fig. 2

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UNITED STATES PATENT OFFICE.

BURT F. UPHAM, OF EVANSTON, ILLINOIS.

PRINTING-PRESS.

1,016,659.

Specification of Letters Patent.

Patented Feb. 6, 1912.

Application filed March 3, 1911. Serial No. 612,138.

To all whom it may concern:

Be it known that I, BURT F. UPHAM, of Evanston, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Printing-Presses; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improvement in rotary sheet printing presses and it consists in the novel combination of parts in such press, and the novel construction and operation of said parts; all of which will be hereinafter clearly described in detail with reference to the drawings and summarized in the claims following such description.

The principal object of the invention is to provide a rotary cylinder press having one printing couple capable of printing two sheets at each rotation of the impression cylinder; also capable of printing all sizes of sheets up to the maximum size of plate or form that the plate cylinder can carry; and also capable of alternately printing sheets of different size and all at a speed limited only by the speed at which the sheets can be fed.

Another object is to provide a press that may be fed from a plurality of tables, and preferably by automatic feeders which are adapted to feed sheets to the grippers of the related impression surfaces on the impression cylinder.

Another object is to provide such a press with a delivery apparatus whereby sheets fed from different feeder tables may be delivered separately, upon different receiving tables; in other words, so that sheets fed from one feed table may be printed and delivered on one receiving table; and sheets fed from another feed table may be printed and delivered on another receiving table. Also to enable the sheets fed from both feeders to be delivered together on one receiving table. Also to enable slip sheets to be used if desired, which slip sheets can be fed from one feeder and may be delivered with the printed sheets fed from the other feeder on either table.

Another object is to provide such press with a double tape delivery, whereby the sheets may be conveniently delivered, separately, or together, or with slip sheets, as

above stated. The printed sheets are delivered on the tables printed side up.

My said press requires but one impression cylinder, one form cylinder, and one inking mechanism; but, in the preferred form, it has two separate feed tables preferably equipped with automatic feeders, and when fed thereby at the rate of 3000 sheets each per hour, which is a practical speed, the press will print and deliver 6000 printed sheets per hour; although the surface speed of the impression cylinder will be only about one-half that of the impression cylinder on a bed cylinder press, in which the cylinder must make two revolutions for each sheet printed. The reduction of the surface speed of the cylinder in my press facilitates and insures accurate register; and when my press is printing 6000 sheets per hour the surface speed of the printing cylinders, the closing of the grippers and the peripheral speed of the ink rolls and the speed of delivery of the printed sheets will be no more rapid than corresponding parts in a bed and cylinder press of like size when printing about 1700 sheets per hour.

My press may also be used as a perfecting press by returning the sheets through the press, so they will be backed by separate forms on the plate or form cylinder at successive operations. And two different sized sheets may be printed from different forms; or the same size sheets may be printed by duplicate forms on one side.

I will now describe the invention with reference to the accompanying drawings in which—

Figure 1 is a longitudinal sectional elevation of a complete printing press embodying the invention. Fig. 2 is an enlarged side elevation thereof showing the throw-off mechanism and tripping devices.

In the drawings 1 designates the plate cylinder and 2 the impression cylinder co-acting therewith, the plate cylinder in this instance being mounted above the axis of the impression cylinder and to one side thereof. The plate cylinder is adapted to carry two or more diametrically opposed forms or sets of forms, and therefore has two diametrical surfaces 1^a, 1^b to which plates may be attached. The impression cylinder similarly has two diametrically opposed impression surfaces 2^a, 2^b respectively adapted to co-act with the printing plates on

the surfaces 1^a, 1^b of the plate cylinder. When the surfaces 1^b, 2^b are in operation the surfaces 1^a, 2^a are out of operation, and vice versa. The surfaces 1^a, 1^b are adapted to alternately print on separate sheets, so that for each rotation of the cylinders two sheets may be printed from separate plates or forms, which plates may be duplicates, or different, and of same or different size. Of course groups of small plates could be attached to either or both of the surfaces 1^a, 1^b and impressions taken simultaneously from such groups, or a sheet or sheets presented by the opposed impression surfaces 2^a or 2^b;—this mode of grouping forms being well known in the art.

The cylinder 2 is provided with sets of gripping mechanism of usual construction indicated at 2^c, 2^d; the grippers 2^c being adapted to only take sheets fed from feed table 3^b at the point 3^c; while the grippers 2^d are adapted to only take sheets from the grippers 3^c at the points 3^d of a transfer reel 3^e, to which the sheets are supplied from a table 3^a by means of tapes 3^f running over suitable rollers, indicated in the drawings. Sheets are delivered from the table 3^b to the point 3^c by means of tapes 3^h, as indicated in the drawings.

It will be observed that the reel 3^e is adapted to deliver sheets fed from table 3^a to the surface 2^a of cylinder 2 at a point below and in advance of the point 3^c; but the parts are so arranged and timed that the sheets fed from table 3^b will be taken only by the grippers 2^c of the impression cylinder, while the sheets fed from table 3^a will be taken only by the grippers 2^d of the impression cylinder; so that sheets from table 3^b will be presented only to the plates on surface 1^b of the plate cylinder, and the sheets fed from table 3^a will be presented only to the plates on surface 1^a of the impression cylinder.

The sheets are taken from the impression cylinder 2 at the point 4^x by means of grippers 4^a on a transfer cylinder 4, which is geared to rotate with the cylinder 2, and the grippers 4^a are so arranged and timed that they will take the sheets alternately from both sets of grippers 2^c and 2^d, at the point 4^x. In other words the transfer cylinder 4 will take all the sheets from both grippers 2^c and grippers 2^d at the point 4^x. The cylinder 4 delivers the sheets in turn to a delivery cylinder 4^b, which may be provided with sheet taking and collecting devices of any suitable kind, well known in the art, and which may be readily adapted to deliver the sheets separately or together.

As shown in Figs. 1 and 2, two sets of stripping fingers 5^a, 5^b are located adjacent the upper farther side of the delivery cylinder 4^b, and usual mechanism is provided whereby if desired the strippers 5^a are

caused to take the sheets fed from the table 3^a and direct them to one delivery, and the strippers 5^b are caused to take the sheets fed from table 3^b and direct them to another delivery. The strippers 5^a are adapted to deliver sheets into a delivery apparatus 6^a; and the strippers 5^b deliver sheets to a delivery apparatus 6^b. Each delivery apparatus preferably consists of pairs of endless tapes arranged at each side of the path of the sheet and adapted to grasp the sheet by its side margins as it comes from cylinder 4^b, and suspend such sheet and carry it out over the receiving table to the point of dropping, and there the tapes are caused to release the sheet and let it fall upon the receiving table. Tape deliveries of this type are especially well adapted for use on this machine, but are not claimed herein. As stated the tape delivery 6^a is adapted to receive the sheets A fed from table 3^a, and will carry them forward to and over the receiving table A' and deposit them thereupon. While the tape delivery 6^b is designed to receive sheets B fed from table 3^b and carry them above the delivery 6^a and over table A' and deposit them upon the table B'. Thus sheets A can be delivered on table A' and the sheets B upon table B'. If it is desired however one of the strippers can be thrown out of operation, and the other set so that both sheets A and B will be delivered upon the same table. If, for example, the stripper 5^a is thrown out of operation, then both sheets A and B will be delivered upon table B'. If stripper 5^b is thrown out of operation both sheets A, B, will be delivered on table A'. As above stated the sheets on one table might be slip sheets and then only the sheets on the other table would be printed; but the printed sheet and slip sheet could be delivered together upon either table A' or B'. If the sheets from both feed tables are to be delivered upon one receiving table I preferably provide cylinder 4^b with collecting devices of the well known type, and adjust same to collect a sheet from table 3^b and a sheet from table 3^a, and then discharge them together into either delivery 6^a, or 6^b, so that both sheets will be delivered simultaneously upon either table A', or B', desired. I have not deemed it necessary to show such collecting devices in detail in cylinder 4^b, as they are well known in the art; and so are the means for driving the several cylinders and the construction of the tape deliveries, so that any one familiar with rotary printing presses will readily understand how to construct and use such parts. I moreover do not wish to be restricted to the use of endless tape marginal delivery apparatus, although I prefer them. The sheets may be fed from tables 3^a, 3^b by hand, but I preferably employ auto-

matic feeders of the well known "Cross" or "Dexter" type, as shown, for example in patent to Cross No. 812,260, and such feeders are indicated in the drawings; but I do not consider the invention restricted to this particular type of feeder.

The plates on cylinder 1 may be inked by a system of form rollers 7^c which receive ink from distributing rolls 7^b, 7^a supplied from a single fountain 7 above the cylinder 1, as indicated in the drawings. The particular inking mechanism indicated in the drawings is not claimed herein, but I do not consider the present invention limited to any particular inking mechanism.

It will be seen that the cylinder 1 can easily be plated by the pressman standing upon a platform 8 which extends across the press at the side of the plate cylinders above the delivery mechanism. The cylinder 2 can be readily packed or made-ready by the pressman sitting beneath the reel 3^c at the side of the cylinder below the feed tables. It is not necessary in order to make ready the press to remove the feed tables or open up any parts or part of the press. The impression cylinder is accessible for make-ready without lifting the feed tables or opening any part or parts of the press. The printing forms or plates on the form cylinder are also accessible without opening or removing any parts of the press. The feed tables are located one above the other so that the two require no more floor space than one. The lower feeding board or feeding machine can be supplied with paper by an attendant while standing on the floor, or at the most by mounting not more than one step; while the upper feeding board or feeding machine is practically no higher than those attached to the ordinary flat bed and cylinder presses. The inking mechanism being located at the highest point of the press, the ink used and the inking mechanism will be kept warm and at more uniform temperature than if at the floor, owing to the fact that the temperature in a room is warmer in the upper part. The delivery mechanism and feeding tables being at opposite ends of the press, enables the pressman to carefully watch and attend to all the printed sheets, as they are delivered printed side up; while his assistant can attend to the feed end of the press.

The press requires about the same floor space as a flat bed and cylinder press printing a sheet of like size; but my press will produce from two to four times the output of a flat bed press.

In the press as actually constructed, I provide automatic tripping mechanism whereby the impression is thrown off in case a sheet is improperly fed to either impression surface 2^b, 2^a, or not fed from either feed table. This tripping mechanism forms

the subject-matter of my application Serial No. 550,068 filed March 17, 1910, and I refer thereto for a full and complete description thereof.

Located on each feed table adjacent the point where the cylinder grippers take hold of a sheet are detector fingers 9 which are immediately connected to a rock shaft 9^a, by devices not shown, and are adapted, in case a sheet of paper fails to be properly presented to the cylinder grippers, (by means of devices not shown) to cause the rocking of lever 9^b hung on shaft 9^a. The lever 9^b on the upper shaft 9^a is connected by a rod 9^c to a rocking lever 9^d which is pivoted on the frame and in turn is connected by a rod 9^e to a lever 9^f, pivoted on the frame and connected by a dog 9^g to a lever 9^h on a lever 9ⁱ that is pivoted beside an oscillating lever 9^j that is continuously oscillated by a cam 9^k, all as fully described in my application No. 550,068 aforesaid; lever 9ⁱ is also connected by a link 9^l to a lever 2^a that operates the throw off cam 2^m that moves cylinder 2 on or off impression. The lever 9^b on the lower rock shaft 9^a is connected by a rod 9^m to lever 9^d also, so that if the detectors 9 on either table find a misplaced sheet, the dog 9^h is caused to engage lever 9ⁱ and consequently the cylinder 2 is thrown off impression during the time that such sheet should have been printed, as described in my aforesaid application. By this mechanism the impression cylinder 2 is thrown off impression only for that part of its revolution necessary to prevent printing a non-fed, or improperly fed, sheet; but it is thrown on impression in time to cause the printing of a sheet properly fed from the other table, so the press is not prevented from printing such sheets. The operator does not have to stop the press while he is re-adjusting or removing the improperly fed sheet, and as soon as such sheet is properly adjusted, or as soon as a new sheet is properly fed in place thereof, the cylinder is automatically thrown on impression for that part of its rotation necessary to print such sheet. This automatic throwing off and on of impression is a very material advantage of my press and greatly increases its efficiency and the total capacity or output thereof; for whether the press is fed by hand or automatically if either feeder fails to feed sheets to the impression cylinder, the latter is moved away from the plate cylinder during the time that such sheet should have been printed; thus preventing printing on the packing or impression surface; but the impression cylinder can continue to print the properly fed sheets from the other table. The tripping of the cylinder for the two impression surfaces is independent, so that either surface may continue its printing operations while the other is tripped.

Thus it is not necessary to stop the press to prevent printing on the packing if either feeder fails to feed a sheet properly. The said tripping mechanism is fully shown and described in my application 550,068 aforesaid and needs no further explanation herein. The detectors 9 also control devices (not shown) for throwing the related sheet feeding devices out of operation and stopping the feed of the sheets until the misplaced sheet is removed. Such devices however are well known and do not form any part of the present invention and therefore need not be explained or shown herein.

Having thus described my invention what I therefore claim as new and desire to secure by Letters Patent thereon is:

1. A rotary sheet printing press comprising a plate cylinder having a plurality of printing surfaces, an impression cylinder beside and below the axis of the plate cylinder and having a plurality of impression surfaces each adapted to co-act with one related printing surface on the plate-cylinder, a plurality of feed tables each adapted to deliver sheets to one related impression surface of the impression cylinder; a transfer cylinder adapted to take all the sheets from the impression cylinder, a delivery cylinder adapted to take all the sheets from the transfer cylinder, two receiving tables, and delivery mechanism whereby the sheets fed from the separate tables may be delivered to separate receiving tables.

2. A rotary sheet printing press comprising a plate cylinder having diametrically opposed printing surfaces, an impression cylinder beside and below the axis of the plate cylinder and having diametrically opposed impression surfaces respectively adapted to co-act with a related printing surface on the plate cylinder; two feed tables respectively adapted to deliver sheets to the related impression surface of the impression cylinder, a transfer cylinder adapted to take all the sheets from the impression cylinder, a delivery cylinder adapted to take all the sheets from the transfer cylinder, two receiving tables, and mechanism whereby alternate sheets may be transferred from the delivery cylinder to different receiving tables.

3. In a rotary sheet printing press, a plate cylinder having a plurality of printing surfaces, an impression cylinder beside and below the axis of the plate cylinder and having a plurality of impression surfaces each adapted to co-act with a related printing surface on the plate cylinder; a plurality of feed tables respectively adapted to deliver sheets to the related impression surface of the impression cylinder; a collecting cylinder below and to one side of the axis of the plate cylinder, means for transferring all the sheets from the impression cyl-

inder to the collecting cylinder, a plurality of delivery mechanisms adapted to deliver sheets on separate tables, and means whereby the sheets may be directed from the collecting cylinder to the same table or to separate tables.

4. In a rotary sheet printing press, a plate cylinder having diametrically opposed printing surfaces, an impression cylinder beside and below the axis of the plate cylinder having diametrically opposed impression surfaces respectively adapted to co-act with a related printing surface on the plate cylinder; two feed tables respectively adapted to deliver sheets to a related impression surface of the impression cylinder; a collecting cylinder below and to one side of the axis of the plate cylinder, means for transferring all the sheets from the impression cylinder to the collecting cylinder, a pair of delivery mechanisms adapted to deliver sheets on separate tables, and means whereby successive sheets may be directed from the collecting cylinder to separate tables, or whereby the sheets may be collected and directed to one table.

5. A rotary sheet printing press comprising a plate cylinder having diametrically opposed printing surfaces, an impression cylinder beside and below the axis of the plate cylinder and having diametrically opposed impression surfaces respectively adapted to co-act with a related printing surface on the plate cylinder; two automatic feed tables respectively adapted to deliver sheets to the related impression surface of the impression cylinder, a transfer cylinder adapted to take all the sheets from the impression cylinder, a delivery cylinder adapted to take all the sheets from the transfer cylinder, two receiving tables, and mechanism whereby alternate sheets may be transferred from the delivery cylinder to different receiving tables, or all the sheets may be delivered to one table.

6. A rotary all size sheet printing press, comprising a plate cylinder having a plurality of printing surfaces, an inking mechanism above the plate cylinder cooperating with the forms thereon, an impression cylinder below and to one side of the axis of the plate cylinder, having a plurality of impression surfaces respectively co-acting with related printing surfaces on the plate cylinder; a plurality of feed tables at one side of the impression cylinder respectively delivering sheets to the related impression surfaces of the impression cylinder; with a transfer cylinder adapted to take all the sheets from the impression cylinder; a delivery cylinder adapted to take all the sheets from the transfer cylinder, a plurality of delivery tables, and delivery mechanism whereby the sheets fed from separate tables may be transferred from the delivery cyl-

inder to separate delivery tables, or all the sheets may be delivered to one table.

7. A rotary all size sheet printing press comprising a plate cylinder having two diametrically opposed printing surfaces, an impression cylinder below and to one side of the axis of the plate cylinder, having two diametrically opposed impression surfaces, each co-acting with its related printing surface on the plate cylinder; a pair of automatic feed tables at one side of the impression cylinder, one of said tables feeding sheets to one impression surface of the impression cylinder, and the other of said tables feeding sheets to the other impression surface of said impression cylinder; a collecting cylinder below and to one side of the plate cylinder, means for transferring all the sheets from the impression cylinder to the collecting cylinder, a pair of delivery mechanisms adapted to deliver sheets on separate tables, and means whereby successive sheets may be directed from the collecting cylinder to the separate deliveries, or whereby collected sheets may be directed from the collecting cylinder to one delivery.

8. In a rotary all size sheet printing press, the combination of a plate cylinder having two diametrically opposed printing surfaces, an inking mechanism cooperating with forms thereon, an impression cylinder below and to one side of the axis of the plate cylinder, having two diametrically opposed impression surfaces each co-acting with but one related printing surface on the plate cylinder; a pair of automatic sheet feeding devices at one side of the impression cylinder, one of said devices feeding sheets to one impression surface of the impression cylinder, and the other of said devices feeding sheets to the other impression surface of said impression cylinder; with a transfer cylinder adapted to take all the sheets from the impression cylinder; a delivery cylinder adapted to take all the sheets from the transfer cylinder, two delivery tables, and delivery mechanism whereby alternate sheets may be delivered to separate delivery tables, or all the sheets may be delivered to one table.

9. In a rotary all size sheet printing press, the combination of a plate cylinder having two diametrically opposed printing surfaces, an inking mechanism above the plate cylinder cooperating with both the printing surfaces; an impression cylinder below and to one side of the axis of the plate cylinder and having two diametrically opposed impression surfaces each co-acting with its related printing surface on the plate cylinder; a pair of automatic feed devices at one side of the impression cylinder, one of said devices feeding sheets to one impression surface of the impression cylinder, and the other of said devices feeding sheets to the

other impression surface of said impression cylinder; with a collecting cylinder below and to one side of the plate cylinder, a transfer cylinder for transferring all the sheets from the impression cylinder to the collecting cylinder; two delivery mechanisms adapted to deliver sheets on separate tables, and means for directing successive sheets from the collecting cylinder to separate deliveries, or whereby collected sheets may be directed from the collecting cylinder to one delivery.

10. A rotary sheet printing press comprising a plate cylinder having opposed printing surfaces, an impression cylinder beside the plate cylinder having opposed impression surface respectively adapted to co-act with the related printing surface on the plate cylinder; two feed tables respectively adapted to deliver sheets to the related impression surface of the impression cylinder; two receiving tables and mechanism whereby alternate sheets may be transferred from the impression cylinder to the same or different receiving tables; with means for throwing off and on impression, and devices on each feed table whereby if a sheet is improperly fed on either table the impression is thrown off during the time such sheet should have been printed, and thrown on for properly fed sheets.

11. In a rotary sheet printing press, a plate cylinder having opposed printing surfaces, an impression cylinder beside the plate cylinder having opposed impression surfaces respectively adapted to co-act with a related printing surface of the plate cylinder; two feed tables respectively adapted to deliver sheets to a related impression surface of the impression cylinder; a pair of delivery mechanisms adapted to deliver the printed sheets on separate tables, and means whereby successive sheets may be directed from the impression cylinder to said separate tables, or whereby the sheets may be directed to one table; with means for throwing the impression cylinder on and off impression, and devices on each feed table whereby if a sheet is improperly fed thereon the throw-off mechanism is tripped and operates to throw the impression cylinder off impression during the time that such sheet should have been printed and is then thrown on impression in time to print properly fed sheets, substantially as described.

12. A rotary sheet printing press comprising a plate cylinder having opposed printing surfaces, an impression cylinder beside the plate cylinder and having opposed impression surfaces respectively adapted to co-act with a related printing surface on the plate cylinder; two feed tables respectively adapted to deliver sheets to the related impression surface of the impression cylinder, mechanism for throwing

the impression cylinder on and off impression, and devices on each feed table whereby if a sheet is improperly fed on either table the throw-off mechanism is tripped so as to throw the cylinder off impression during the time such sheet should have been printed and thrown on impression to print properly fed sheets; with a transfer cylinder adapted to take all the sheets from the impression cylinder, a delivery cylinder adapted to take all the sheets from the transfer cylinder, two receiving tables, and mechanism whereby alternate sheets may be transferred from the delivery cylinder to different receiving tables.

13. In a rotary sheet printing press, a plate cylinder having opposed printing surfaces, an impression cylinder beside the plate cylinder having opposed impression surfaces respectively adapted to co-act with a related printing surface on the plate cylinder; two feed tables respectively adapted to deliver sheets to a related impression surface of the impression cylinder; a collecting cylinder below and to one side of the axis

of the plate cylinder; mechanism for throwing the impression cylinder on and off impression, and devices on each feed table whereby if a sheet is improperly fed on either table the throw-off mechanism is tripped so as to throw the cylinder off impression during the time such sheet should have been printed and thrown on impression to print properly fed sheets; with means for transferring all the sheets from the impression cylinder to the collecting cylinder, a pair of delivery mechanisms adapted to deliver sheets on separate tables, and means whereby successive sheets may be directed from the collecting cylinder to said separate tables, or whereby the sheets may be collected and directed to one table.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

BURT F. UPHAM.

Witnesses:

PERCY G. SHAW,
R. M. MARKEL.