

Nov. 3, 1936.

F. R. BELLUCHE

2,059,677

FEEDER FOR PRINTING PRESSES

Filed Aug. 26, 1935

3 Sheets-Sheet 1

Fig. 1.

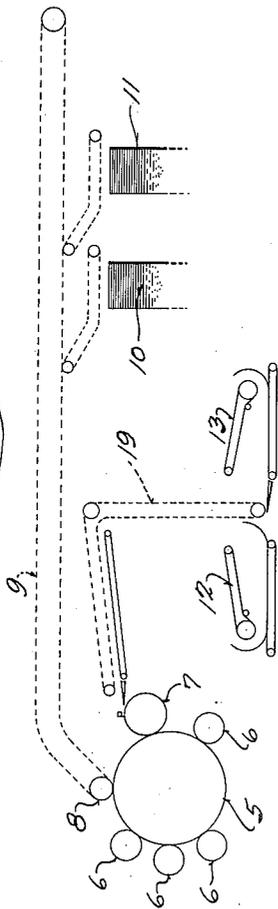
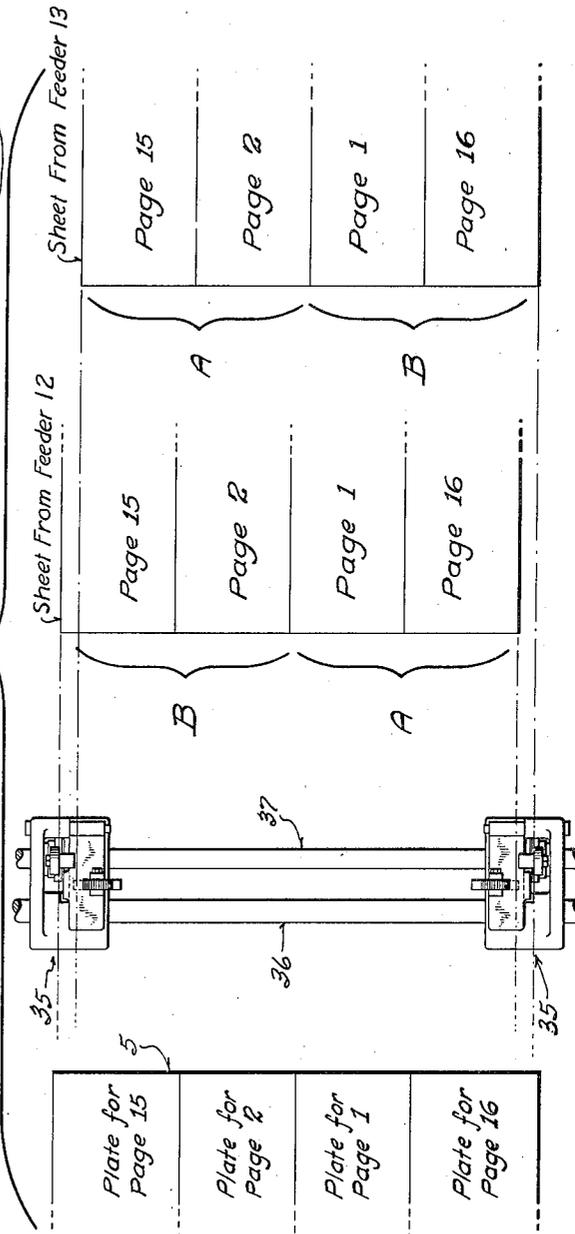


Fig. 9.



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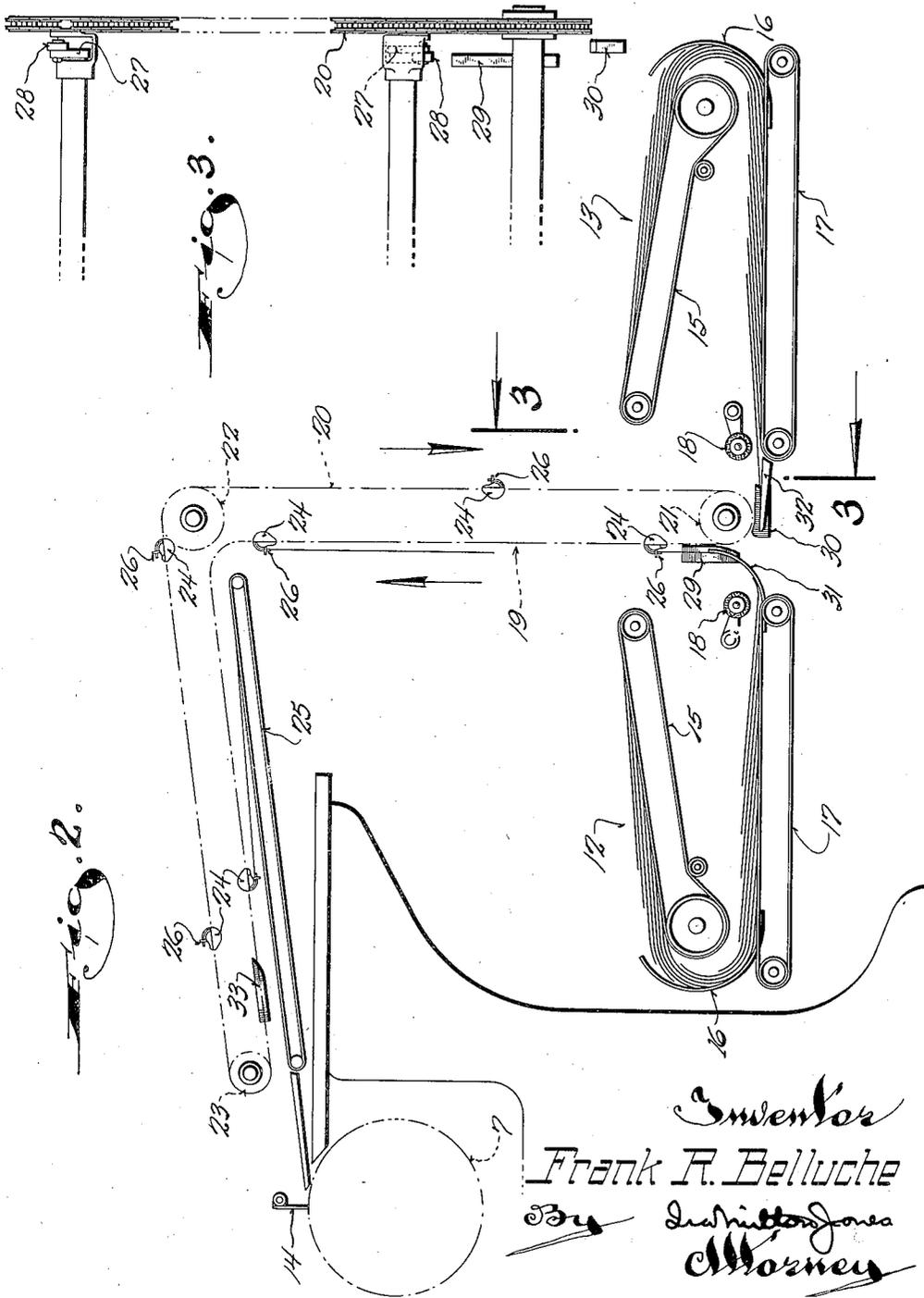
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FEEDER FOR PRINTING PRESSES

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3 Sheets-Sheet 2



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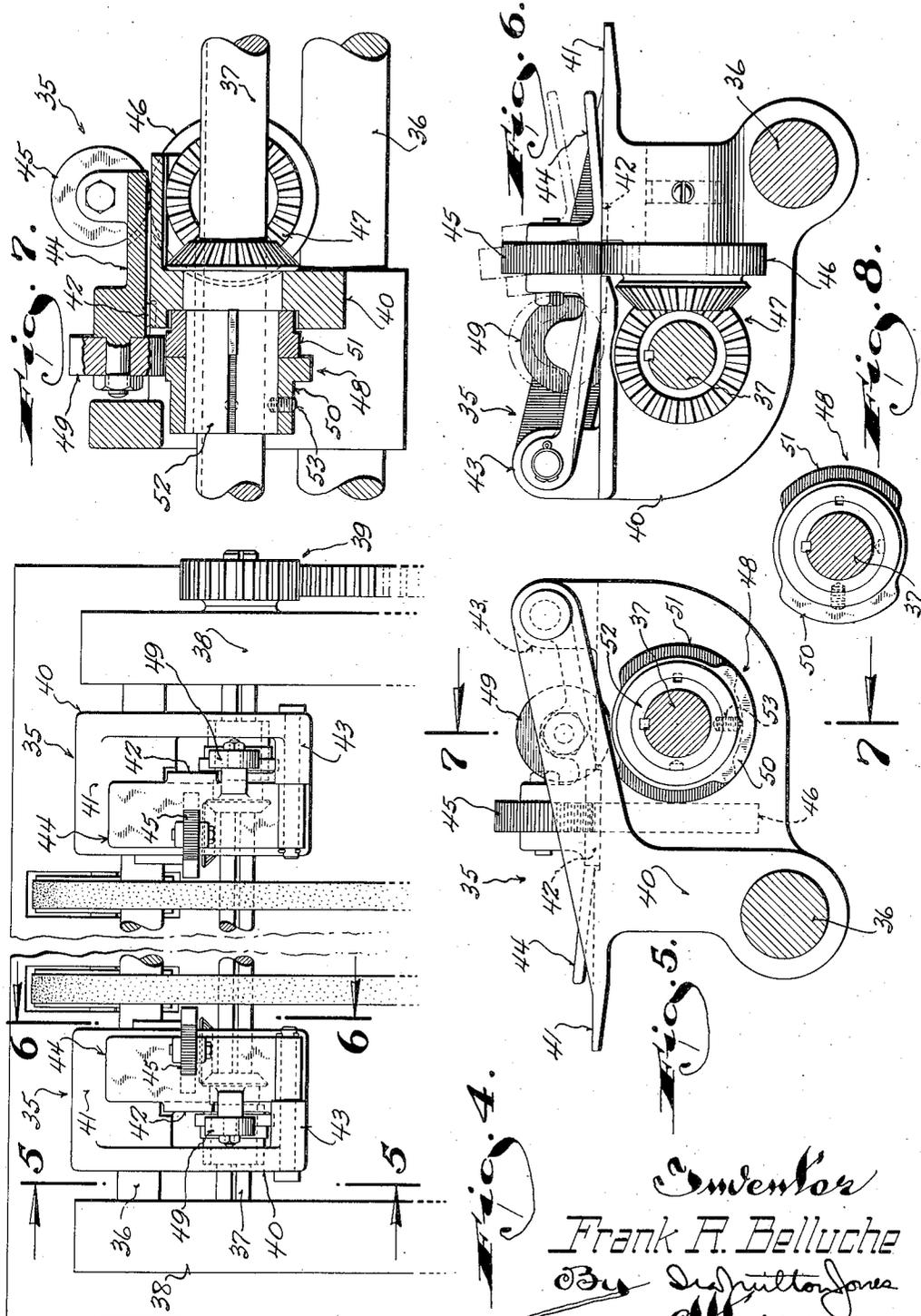
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FEEDER FOR PRINTING PRESSES

Filed Aug. 26, 1935

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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FEEDER FOR PRINTING PRESSES

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Application August 26, 1935, Serial No. 37,920

17 Claims. (Cl. 271-9)

This invention relates to improvements in feeders for printing presses.

The larger presses are generally equipped with two deliveries and often have two feeders, but heretofore the arrangement has been such that a separate set of front and side guides had to be provided for each feeder. Besides separate guides for each feeder, two feed cylinders were also required. This obviously complicated the design of the press.

Where the work is printed on one side only, separately front and side guiding the sheets fed by the two feeders introduced no serious difficulties, but when the sheets are printed on both sides and perfect register between the printing on opposite sides must be obtained, the disadvantages of the past constructions become evident.

It is therefore an object of this invention to provide a novel manner of feeding a printing press from two independent feeders, but with both feeders feeding to the same set of front guides.

The feeder of this invention is particularly well suited to the "work and turn" method of printing. In this method of printing the sheets are printed on one side and then turned transversely and printed on the other side. To those skilled in the art, it will be manifest that in this method of printing the sheets must be side guided at one side of the machine during the printing of the first side of the sheet and side guide from the other side of the machine during the printing of the other side of the sheet. In other words, the side guiding must be done at the same edge of the sheet in each instance.

This invention thus has as another object to provide a side guide at each side of the machine.

Also, inasmuch as one feeder is to feed sheets for initial passage through the press and the other feeder is to feed the sheets printed on one side for their second passage through the press, and as the feeders function alternately, it is another object of this invention to provide side guides so arranged that each functions on alternate sheets.

Another object of this invention is to provide dual side guides and means whereby one of the guides may be caused to act on each successive sheet so as to adapt the feeder for ordinary one side printing.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially

as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a view diagrammatically illustrating a conventional press equipped with two deliveries and the dual feeder of this invention;

Figure 2 is a side elevation of the feeders per se;

Figure 3 is a detail section view taken through Figure 2 on the plane of the line 3-3;

Figure 4 is a top plan view of the delivery end of the conveyer with the central portion cut away;

Figure 5 is a section view taken on the plane of the line 5-5 in Figure 4;

Figure 6 is a section view taken on the plane of the line 6-6 in Figure 4;

Figure 7 is a cross section view taken through Figure 5 on the plane of the line 7-7;

Figure 8 is a detail view of the cams for controlling the functioning of the side registers; and

Figure 9 is a diagrammatic view illustrating the manner in which the sheets are fed to the press.

Referring now more particularly to the accompanying drawings in which like numerals indicate like parts throughout the several views, and particularly to Figure 1, the numeral 5 designates the impression cylinder of a printing press equipped with a plurality of plate cylinders 6, a feed cylinder 7, and a delivery cylinder 8. A delivery 9 carries the sheets from the delivery cylinder 8 alternately to one of two stacks or piles 10 and 11.

The feed cylinder 7 is adapted to receive the sheets fed by two feeders 12 and 13. In this respect, the present invention distinguishes considerably from past practice wherein a separate feed cylinder and separate front guides and associated conveyer mechanism were provided for each feeder. With this invention, as already stated, both feeders 12 and 13 feed to a single feed cylinder 7 and a single set of front guides 14. The manner in which this is accomplished will now be described.

As best shown in Figure 2, the feeders 12 and 13 are both of the continuous type and are arranged with their discharge ends opposed. As is customary in this type of feeder, the sheets are

fanned out and loaded upon an upper feed board having an endless tape conveyer 15 which advances the bank of sheets around a turn 16 and onto a lower feed board equipped with an endless belt conveyer 17.

The conveyer 17 advances the bank of sheets to the discharge end of the feeder at which point drop rolls 18 engage the sheets to project the same from the feeder end to a conveyer or other mechanism fed by the feeder.

As is well known, a continuous feeder embodies many instrumentalities not shown in the present disclosure, such as combing wheels to comb the sheets out as they approach the point of delivery and tail clamps to hold the second sheet, but as these are all conventional features and as they form no part of the instant invention, they have not been shown.

As noted hereinbefore, the feeders 12 and 13 are so arranged that their discharge ends are opposed or in other words, face each other to present sheets to a single conveyer indicated generally by the numeral 19. The conveyer 19 is like that shown in Patent No. 2,016,479 issued to Frank R. Belluche on October 8, 1935, and comprises endless chains 20 trained about the sprockets 21, 22 and 23, and gripper bars 24 carried by the chains.

The sprockets 21 are lowermost and are located near the discharge ends of the feeders 12 and 13. The sprockets 22 are mounted directly above the sprocket 21 so as to give the conveyer 19 a vertical stretch which carries the sheets up from the feeders to the necessary height for presentment to the press.

At the sprockets 22 the chain conveyer 19 makes an abrupt turn to overlie a tape conveyer 25 which presents the sheets to the front guides 14. The outer stretches of the chain conveyer 19 are guided in this abrupt turn by the sprockets 22 and the inner stretches slide over suitable curved tracks (not shown).

The sprockets 23 are located above the belt conveyer 25 near the feed cylinder so that the sheets carried along by the gripper bars are disposed entirely above the conveyer 25 before they are deposited thereon.

The gripper bars 24 are of the type shown in Patent No. 2,024,140, issued to Frank R. Belluche on December 17, 1935, and include gripper fingers 26 adapted to be opened for gripping and releasing the sheets by levers 27 mounted to be rocked about the axis of the gripper bars through the medium of cams placed in the path of rollers 28 carried by the levers 27. Inasmuch as successive gripper bars are to receive sheets alternately from the two feeders, a cam 29 opens the grippers of the alternate bars to receive sheets from the feeder 12 while a cam 30 opens the grippers of the remaining bars for the reception of the sheets fed by the feeder 13.

As best shown in Figure 3, these cams lie in different vertical planes and the gripper bars which are to receive sheets from the feeder 12 have their cam engaging rollers 28 mounted on the inside of the levers 27 while the gripper bars which are to receive sheets from the feeder 13 have their rollers 28 mounted on the outside of their respective levers 27. The grippers of one gripper bar are thus opened by the cam 29 while those of the next gripper bar are opened by the cam 30. In this manner the conveyer is fed alternately from the two feeders.

The sheets fed by the feeder 12 are guided into

proper position for reception by the grippers of the gripper bars by a curved plate 31 which turns the forward edge of the sheet upwardly into position to be gripped by the grippers, and to guide the sheets fed by the feeder 13 for presentment to the grippers, a plate 32 is provided.

The opening of the grippers to cause the sheets carried thereby to be dropped onto the tape conveyer 25 is accomplished by a single cam 33 which is wide enough to lie in the path of the rollers 28 of all gripper bars regardless of whether they are mounted on the inside or the outside of the levers 27. Upon being dropped onto the tape conveyer 25, the sheets are advanced so that the forward edges abut the front guides 14. At this instant the sheet must be side guided. For this purpose a novel side guiding mechanism has been provided.

The side guide mechanism comprises two similar units 35 mounted on a cross bar 36 and a shaft 37. The cross bar 36 is anchored to side frames 38 and the shaft 37 is journaled in said side frames to be driven by gearing 39 connected in any suitable manner with the drive mechanism of the feeder.

Each unit 35 is slidable transversely on the cross bar 36 and the cross shaft 37 so as to permit the same to be located to accommodate sheets of different widths. The side register units 35 are of conventional construction and each comprises a casting 40 having bearings for the rod 36 and the shaft 37 and providing a table portion 41 across which the sheets move in their passage to the press.

Pivotally mounted from a bearing 43 formed as an integral part of the casting 40 is a hammer unit 44 arranged to overlie the table 41 and carrying a knurled idler wheel or roller 45. The knurled wheel 45 is so positioned as to be disposed directly over a driven wheel 46 having a smooth periphery and carried by the casting 40 with its upper edge flush with the plane of the table 41. The driven wheel 46 is continuously driven from the shaft 37 through bevel gears 47 in a direction such that when an edge portion of a sheet is disposed between the wheels, the sheet will be drawn sidewise into engagement with a lug 42 depending from the hammer and projecting into a hole in the table 41.

To permit the disposition of the sheet between the wheels 45 and 46, the hammer 44 is lifted intermittently in time with the feeding of the sheets by means of a cam indicated generally by the numeral 48 and mounted on the shaft 37. A cam roller 49 carried by the pivoted hammer tracks on the cam to lift the hammer in time to permit the disposition of a sheet thereunder. When the low part of the cam rides under the roller 49, the weight of the hammer acts to hold the knurled wheel 45 down on the sheet and against the driven wheel 46. If desired, the force of gravity acting upon the hammer 44 may be augmented by a spring, which, however, for purposes of clarity, has not been shown.

Inasmuch as the successive sheets are to be alternately side guided to opposite sides of the machine, the cams 48 are mounted on the shaft 37 in opposed relationship, that is, their low points are diametrically opposite.

If ordinary one sided printing is to be done, all of the sheets presented to the press should be side guided on one side of the machine. This requires elimination of the side guiding at one side of the machine and a revision of the func-

tioning of the side guide on the other side of the machine so that it operates on successive sheets rather than on alternate sheets.

To eliminate the side guiding at one side of the machine, it is only necessary to slide the entire unit 35 outwardly beyond the range of the sheets so that while the mechanism continues to function it has no effect upon the sheets passing to the press. The revision of the other side guide to cause the same to act on successive sheets may be effected by providing a double acting cam in place of the single acting cam 48. If desired, a complete substitution of cams may be made, but more preferably the cam 48 is constructed in two relatively rotatable sections 50 and 51.

Both sections 50 and 51 may be mounted upon the hub 52 of one of the gears 47 and as best shown in Figure 7, the cam section 51 is confined between the bearing in the casting 40 and the cam 50 and is keyed to the hub 52 so as to positively turn therewith. The cam section 50 is removably held to the hub 52 by a set screw 53.

The cam section 51 has but one fixed position of rotation on the hub 52 while the cam section 50 may be locked to the hub in either of two positions at ninety degree angles to each other. The cam section 51 also has two "highs" and two "lows" while the cam section 50 has only a single "high". With the cam section 50 in one of its two positions, its "high" bridges one of the "low" portions of the cam section 51 so that the composite cam has but a single "low" spot permitting the hammer 44 to descend but once for each revolution of the shaft 47. This, as noted hereinbefore, is the condition of the parts when the side registering is being done at both sides of the machine.

With the cam section 50 turned ninety degrees so that its "high" registers with one of the "highs" of the cam section 51, the composite cam then has two "highs" and two "lows" so that the hammer 44 is permitted to descend twice for each revolution of the shaft 47. This is the condition of the parts when all the side registering is to be done at one side of the machine, and as the timing of the shaft 47 is properly coordinated with the feed of the sheets, the side register will then function on successive sheets as they are fed to the press.

Operation

If the sheets are to be printed only on one side, both feeders 12 and 13 are loaded with blank paper and both alternately feed the conveyer 19 which carries the sheets to the single set of front guides 14. The side guiding in this instance is all done on one side of the machine and hence the composite cam 48 of the side register unit 35 which is to function is adjusted to provide two "low" spots. After being printed, the sheets are delivered alternately to the two stacks or piles.

If the "work and turn" method of printing is employed, a number of sheets are first run through the press as in ordinary one sided printing so that all of the sheets are side guided on one side and all are properly printed on one side.

After a suitable number of sheets have been printed in this manner, the said composite cam 48 is re-adjusted so as to have but a single low spot so that its side register unit functions only on alternate sheets, and the other side register unit, whose cam has not been changed from its condition having but a single low spot, is moved in to proper operative position. Then the sheets

which have been printed on one side are loaded on one feeder and blank sheets are loaded on the other feeder. Thereafter the press delivers half finished sheets on one pile and completely finished sheets on the other pile, the sheets having one side already printed having been turned over before being loaded upon their feeder.

To more clearly illustrate the operation of the machine during the "work and turn" method of printing, reference is had to the diagrammatic illustration shown in Figure 9. For purposes of illustration this view shows a "set up" for printing opposite sides of sheets which are to form the pages of a book or magazine. The sheet to be printed is of a width to form two side by side double sheets A and B of the book or magazine. The double sheet A on one side has pages 1 and 16 printed thereon and the same side of the double sheet B has pages 2 and 15 printed thereon. The plates consequently are so arranged on the plate cylinders as to print these designated pages in the sequence shown.

Assuming that the feeder 12 feeds the sheets for their first passage through the press, as illustrated in Figure 6, this sheet from the feeder 12, is acted upon by one of the side guides 35, using the left hand side edge of the sheet with respect to its direction of travel. The next successive sheet comes from the feeder 13. This feeder feeds the sheets which have had one side printed and have been turned transversely so that the edge of the sheet to be used for the side guiding is now on the right hand side with respect to the direction of travel. Consequently, this sheet is acted upon by the other side guide 35.

The side guides thus function alternately first to one side and then to the other, and as before noted, the alternate sheets are carried to separate piles so that one pile consists of half finished sheets and the other of completely printed sheets.

Obviously, after printing, the sheets are cut to divide the same into double sheets A and B and these are then folded, as is customary.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art to which this invention appertains, that this invention affords a novel manner of feeding a printing press and that the invention is particularly well adapted to the "work and turn" method of printing.

What I claim as my invention is:

1. Feeding means for printing machines and the like having a front guide, comprising a plurality of sheet separating means, and means for carrying successive sheets first from one and then another of said sheet separating means directly to said front guide.

2. In combination with a printing machine and the like having a single set of front guides, two sheet separating devices, and a conveyer to carry successive sheets alternately first from one and then the other of said separating devices directly to said set of front guides.

3. In combination with a single set of front guides for properly positioning a sheet for entrance to a printing machine, two separate sheet feeders, and a conveyer for carrying successive sheets alternately from said feeders to the set of front guides.

4. In combination with single means for properly positioning a sheet for presentment to a printing machine, two separate feeders, and means for carrying successive sheets alternately

from said feeders directly to said positioning means.

5. In combination, single means for properly positioning a sheet for presentment to a printing machine, said means being disposed at an elevation determined by the point of entrance of sheets to the machine, two separate feeders of the continuous type having means for receiving a bank of sheets and for separating individual sheets from the bank, said feeders being mounted at a lower elevation than the positioning means so as to be easily loaded, and a single conveyer for carrying successive sheets alternately from said feeders to said positioning means.

6. In combination, positioning means for properly locating a sheet for presentment to a printing machine and the like, two separate sheet feeders having means for separating individual sheets from a bank, a conveyer for carrying sheets from said feeders to the sheet positioning means, said conveyer including gripper bars with grippers adapted to be opened for the reception and release of sheets, and means for opening the grippers of alternate gripper bars for the reception of sheets from one feeder, and for opening the grippers of the remaining bars for reception of sheets from the other feeder.

7. In combination, positioning means for properly locating a sheet for presentment to a printing machine and the like, two separate sheet feeders having means for separating individual sheets from a bank, a conveyer for carrying sheets from said feeders to the sheet positioning means, said conveyer including gripper bars with grippers adapted to be opened for the reception and release of sheets, means for opening the grippers of alternate gripper bars for the reception of sheets from one feeder, and for opening the grippers of the remaining bars for the reception of sheets from the other feeder, and means adjacent the positioning means for opening the grippers of all of the bars.

8. In combination, means for properly positioning sheets for presentment to a printing machine, two separate sheet feeders including means for separating individual sheets from a plurality, and an endless chain conveyer having gripper bars adapted to carry sheets alternately from said feeders to the sheet positioning means.

9. In combination, sheet positioning means for properly positioning a sheet for presentment to a printing machine, two separate feeders including means for separating individual sheets from a plurality, said feeders being arranged with their discharge ends adjacent, and an endless chain conveyer for carrying sheets alternately from said feeders to the sheet positioning means, said chain conveyer including gripper bars having grippers adapted to be opened and closed, means for opening the grippers of alternate gripper bars for the reception of sheets from one feeder, and means for opening the grippers of the remaining bars for the reception of sheets from the other feeder.

10. In combination, two sheet feeders of the continuous type adapted to receive a bank of sheets and including means for separating individual sheets from the bank, said feeders being arranged with their discharge ends adjacent, and an endless conveyer including gripper bars equipped with grippers for carrying sheets from

said feeders, means mounting a portion of the conveyer adjacent the discharge ends of the feeders, and means for opening the grippers of alternate gripper bars for the reception of sheets from one feeder and for opening the grippers of the remaining bars for the reception of sheets from the other feeder.

11. In combination, two separate sheet feeders including means for separating sheets from a plurality and presenting them for conveyance away from the feeders, an endless chain conveyer arranged with a turn adjacent the discharge ends of the feeders and including gripper bars equipped with grippers for carrying the sheets, means for guiding sheets from the feeders into positions to be gripped by the grippers of the bars as they move past said turn, means for opening the grippers of alternate bars for the reception of sheets from one feeder, and means for opening the grippers of the other bars for the reception of sheets from the other feeder.

12. In combination, two separate sheet feeders having their points of discharge adjacent, an endless chain conveyer for carrying sheets from said feeders to a point removed from said feeders, including gripper bars having grippers adapted to be opened for the reception of sheets, cam means for opening the grippers of alternate gripper bars for the reception of sheets from one feeder, cam means for opening the grippers of the remaining bars for the reception of sheets from the other feeder, and cam means for opening the grippers of all of the gripper bars at said point removed from the feeders to which the sheets are carried by said conveyer.

13. In combination with a printing machine and the like, feeding means to present sheets to the press, and alternately operable side guides at opposite sides of the feeding means for side guiding successive sheets alternately at opposite side edges.

14. In combination with a printing machine, means for presenting sheets to the machine, means for side guiding sheets presented to the machine, and means for operating said guiding means so that said side guiding means acts only on alternate sheets.

15. In combination with a printing machine and the like, means for presenting sheets to the machine alternately from two sources and along a single path, two side guiding means one at each side of said path, and means for alternately operating said side guiding means so that one acts on the sheets from one source and the other acts on the sheets from the other source.

16. In combination with a printing machine, means for presenting sheets to the machine, a side guide at each side of the sheet presenting means, and means for alternately operating said side guides so that successive sheets are side guided alternately by said two side guides.

17. In combination with a printing machine having a single set of front guides, two sheet feeders, a conveyer for carrying sheets alternately from said two feeders to the front guides, and alternately operable side guides for side guiding the sheets from one feeder to one side and side guiding the sheets from the other feeder to the other side.