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SHEET COLLECTING AND FOLDING MECHANISM FOR PRINTING PRESSES

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2 Sheets-Sheet 2
The object of this invention is to provide novel means whereby selected products of a different number of pages and page widths may be delivered in one direction or in opposite directions, as desired.

The object of this invention is more particularly to provide a novel means whereby the production of web pages, when the product is cut into an odd number of sheets or superimposed sheets, may be collected in full or in part on a collecting and folding cylinder having an even number of collecting surfaces, folded off therefrom, and delivered to one delivery in four page signatures or multiples thereof; the remaining sheet or sheets, if any, being folded off from the cutting and folding cylinder and delivered to another delivery.

A further object of my invention is to simplify the mechanism shown, described and claimed in my United States Letters Patent No. 1,866,680, dated July 31, 1934.

A practical embodiment of my invention is represented in the accompanying drawings, in which:

Fig. 1 represents a diagrammatic side elevation showing one of the sleeves of a rotary web perfecting printing press in connection with which my improved sheet collecting and folding mechanism is used;

Fig. 2 represents a diagrammatic side elevation of my improved sheet collecting and folding mechanism;

Fig. 3 represents a detail view in side elevation illustrating the cams for controlling the sheet engaging and folding devices on the several cylinders;

Fig. 4 represents a similar view illustrating another form of cam used for silencing one of the collecting and folding cylinder cams and for silencing the sheet taking devices on the transfer and folding cylinder; and

Fig. 5 represents a detail section of the form of rotary cam illustrated in Fig. 3.

In the embodiment herein shown, the web is designed to be printed and perfected in a single color on each cycle of the press, forty-eight pages, six pages around and four pages across. In Fig. 1, one of the printing couples is shown, the form or printing cylinder being denoted by A and the impression by A'.

The pages wide may be fed from the press to the coating web feed rolls 1 and 2 around the rolls B and F. Two narrow webs two pages wide may be fed from the press to the feed rolls 1 and 2 around the rolls B, C, and F. Four narrow webs one page wide may be fed from the press to the feed rolls 1 and 2 around the rolls B, C, F, D, E and G respectively. The feed rolls 1 and 2 advance the web or webs between the rotary cutter 3, in the present instance a cutting cylinder and the cutting and folding cylinder 4, to cut the web or webs into an odd number of sheets or superimposed sheets each cycle of the press. The rotary cutter 3 is provided with two equally spaced cutting blades 5 and 6 and the cutting and folding cylinder 4 is provided with three cutting slots 7, 8 and 9 for successive coact with the cutting blades 5 and 6 of the said rotary cutter 3. The rotary cutter 3 is two-thirds the circumference of the printing cylinder A, or four pages around. The cutting and folding cylinder 4 has the same circumferential length as the printing cylinder A.

This cutting and folding cylinder 4 is provided with three sets of equally spaced sheet taking devices, in the present instance impaling pins 10, 11 and 12 and a folding blade 13. This folding blade 13 is arranged to coact, when desired, with a folding jaw 14 on a folding and delivery cylinder 15, which has the same circumferential length as the cutting and folding cylinder 4.

The collecting and folding cylinder 16 which has the same circumferential length as the rotary cutter 3 is provided with two equally spaced sheet engaging devices, in the present instance impaling pins 17 and 18, as well as two intermediate equally spaced folding blades 19 and 20, which folding blades coact at the proper times, when so desired, with a single set of folding jaws 21 on the folding and delivery cylinder 22, the circumferential length of which is equal to the printing cylinder A of the press.

A suitable packer delivery 23 is provided for receiving the signatures from the folding and delivery cylinder 15, and another oppositely arranged packer delivery 24 is provided for receiving the signatures from the folding and delivery cylinder 22.

The means which I have shown for controlling the operation of the several sheet engaging and folding devices for collecting, folding and delivering the selected product to one or both deliveries may be constructed, arranged and operated as follows:

A changeable rotary box cam is mounted on the shaft 25 of the cutting and folding cylinder 4, which box cam comprises a common half member 26 and two interchangeable half members 27 and 28. The common half member 26 has a semicircular cam groove 29 concentric with the
shaft 25. The interchangeable half member 27 has a semicircular groove 30 matching with the groove 29 and having an offset portion 31. The interchangeable half member 28 is provided with a semicircular groove 32 matching with the groove 25 in the common half member 26. This groove 32 is concentric with the shaft 25.

When it is desired to control the action of the sets of normally projecting impaling pins 17 and 18 on their sheet taking point 16, the interchangeable half member 27 has a semicircular groove 30 matching with the groove 29 and having an offset portion 31. The interchangeable half member 28 is provided with a semicircular groove 32 matching with the groove 25 in the common half member 26. This groove 32 is concentric with the shaft 25.

When it is desired to control the action of the sets of normally projecting impaling pins 17 and 18 on their sheet taking point 16, the interchangeable half member 27 has a semicircular groove 30 matching with the groove 29 and having an offset portion 31. The interchangeable half member 28 is provided with a semicircular groove 32 matching with the groove 25 in the common half member 26. This groove 32 is concentric with the shaft 25.

When it is desired to control the action of the sets of normally projecting impaling pins 17 and 18 on their sheet taking point 16, the interchangeable half member 27 has a semicircular groove 30 matching with the groove 29 and having an offset portion 31. The interchangeable half member 28 is provided with a semicircular groove 32 matching with the groove 25 in the common half member 26. This groove 32 is concentric with the shaft 25.

When it is desired to control the action of the sets of normally projecting impaling pins 17 and 18 on their sheet taking point 16, the interchangeable half member 27 has a semicircular groove 30 matching with the groove 29 and having an offset portion 31. The interchangeable half member 28 is provided with a semicircular groove 32 matching with the groove 25 in the common half member 26. This groove 32 is concentric with the shaft 25.

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superimposed sheets on the cylinder 16 are folded off onto the folding and delivery cylinder 22 and there slit longitudinally by the slitters 63 into two sixteen page signatures and then deposited onto the delivery 22. The second group of sheets which was folded off from the cylinder 4 is slit longitudinally by the slitters 64 into two eight page signatures and then deposited onto the delivery 23.

Where two twenty-four page signatures are delivered onto the delivery 24, the web is slit longitudinally into two narrow webs two pages wide and superimposed before passing them between the rotary cutter 3 and cutting and folding cylinder 4. These groups of sheets are then alternately by the pins 17 and 18 on the collecting and folding cylinder 16 until three collections are made on each set of pins. The sheets are then successively folded off onto the folding and delivery cylinder 22 and slit longitudinally by the slitters 63 into two twenty-four page signatures and then deposited onto the delivery 23.

Where one thirty-two page signature is to be delivered to the delivery 24 and one sixteen page signature to the delivery 23, the web is slit longitudinally into four narrow webs one page wide and superimposed before being passed between the rotary cutter 3 and the cutting and folding cylinder 4. The first and third groups of sheets are collected by the pins 17 on the cylinder 16 and the second group of sheets is folded off onto the folding and delivery cylinder 16. The groups of sheets on the cylinder 16 are folded off to their folding and delivery cylinder 22. The signatures on these two cylinders 15 and 22 are then delivered to their respective deliveries 23 and 24.

Where one forty-eight page signature is to be delivered to the delivery 24 the web is slit longitudinally into four narrow webs one page wide and superimposed before being passed between the rotary cutter 3 and the cutting and folding cylinder 4. These groups of sheets are alternately by the pins 17 and 18 on the cylinder 16 until three collections are made on each set of pins. The groups of sheets are then successively folded off onto the folding and delivery cylinder 22 and deposited thereby onto the delivery 24.

It will be understood that the several cams hereinbefore described are interchanged and operate to produce the various results set forth. It is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my invention, and hence I do not intend to be limited to the particular embodiment herein shown and described, but

What I claim is:

1. Means for cutting the web product of one cycle of a printing press into an odd number of sheets or groups of sheets and means for collecting and folding the sheets or groups of sheets into various pagged signatures and delivering them to one or two delivery points, said means including a rotary cutter having an even number of equally spaced cutting blades, and a cutting and folding cylinder having an odd number of cutting slots for successive coaction with said cutting blades, an odd number of equally spaced cutting blades, a coating collecting and folding cylinder having an even number of equally spaced sheet collecting surfaces and an even number of intermediate equally spaced folding blades, and two folding and delivery cylinders, one having a single folding jaw arranged to coat with the folding blade on the cutting and folding cylinder, and the other having a single folding jaw arranged to coat with the folding blades on the collecting and folding cylinder.

2. Means for cutting the web product of one cycle of a printing press into an odd number of sheets or groups of sheets and means for collecting and folding the sheets or groups of sheets into various pagged signatures and delivering them to one or two delivery points, said means including a rotary cutter having an even number of equally spaced cutting blades, and a cutting and folding cylinder having an odd number of cutting slots for successive coaction with said cutting blades, an odd number of equally spaced sheet receiving surfaces and a single folding blade, a coating collecting and folding cylinder having an even number of equally spaced sheet collecting surfaces and an even number of intermediate equally spaced folding blades, and two folding and delivery cylinders, one having a single folding jaw arranged to coat with the folding blade on the cutting and folding cylinder, and the other having a single folding jaw arranged to coat with the folding blade on the cutting and folding cylinder, the cutting and folding cylinder and the two folding and delivery cylinders each having the same circumferential length, and the rotary cutter and the collecting and folding cylinder each having two-thirds the circumferential length of the cutting and folding cylinder and the two folding and delivery cylinders.

3. Means for cutting the web product of one cycle of a printing press into three sheets or groups of sheets, means for collecting and folding the sheets or groups of sheets into various pagged signatures and delivering them to one or two delivery points, said means including a rotary cutter having two equally spaced cutting blades, a cutting and folding cylinder having three equally spaced cutting slots for successive coaction with said cutting blades, and three equally spaced sheet receiving surfaces and a single folding blade, a coating collecting and folding cylinder having two equally spaced sheet collecting surfaces and two intermediate equally spaced folding blades, and two folding and delivery cylinders, one having a single folding jaw arranged to coat with the folding blade on the cutting and folding cylinder and the other having a single folding jaw arranged to coat with the folding blades on the collecting and folding cylinder.

4. Means for cutting the web product of one cycle of a printing press into three sheets or groups of sheets, means for collecting and folding the sheets or groups of sheets into various pagged signatures and delivering them to one or two delivery points, said means including a rotary cutter having two equally spaced cutting blades, a cutting and folding cylinder having three equally spaced cutting slots for successive coaction with said cutting blades, three equally spaced sheet receiving surfaces and a single folding blade, a coating collecting and folding cylinder having two equally spaced sheet collecting surfaces and two intermediate equally spaced folding blades, and two folding and delivery cylinders, one having a single folding jaw arranged to coat with the folding blade on the cutting
5 and folding cylinder and the other having a single folding jaw arranged to coact with the folding blades on the collecting and folding cylinder, the cutting and folding cylinder and the two folding and delivery cylinders each having the same circumferential length as the printing cylinder of the press, and the rotary cutter and the collecting and folding cylinder each having two-thirds the circumferential length of the said printing cylinder.

5. In a sheet collecting and folding mechanism for web printing presses, two sheet delivery points, a cutting and folding cylinder, a rotary cutter, a sheet collecting and folding cylinder and two sheet folding and delivery cylinders, the rotary cutter, the collecting and folding cylinder and one of the folding and delivery cylinders each being arranged to coact with the cutting and folding cylinder, and the other folding and delivery cylinder being arranged to coact with the collecting and folding cylinder.

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