

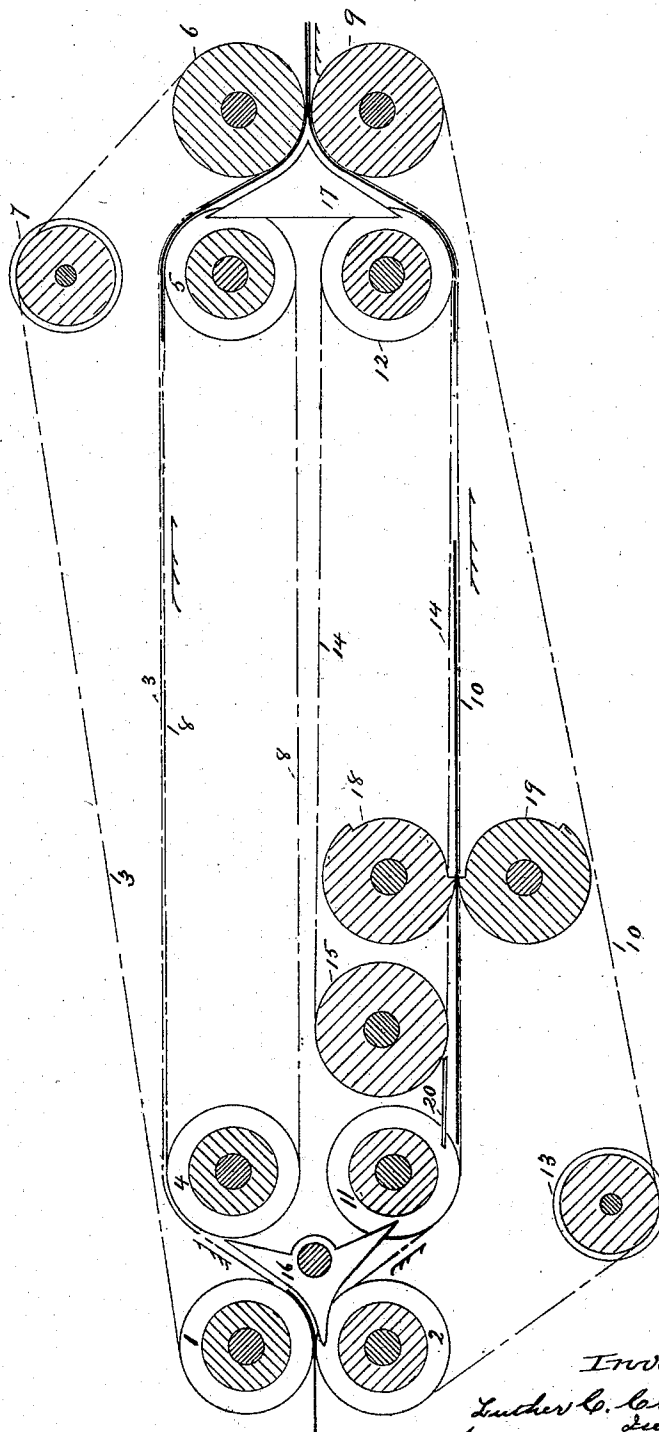
(No Model.)

L. C. CROWELL.

SHEET DELIVERING MECHANISM FOR PRINTING MACHINES.

No. 269,159.

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Attest
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UNITED STATES PATENT OFFICE.

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SHEET-DELIVERING MECHANISM FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 269,159, dated December 12, 1882.

Application filed October 12, 1882. (No model.)

To all whom it may concern:

Be it known that I, LUTHER C. CROWELL, a citizen of the United States, residing in the city of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Sheet-Delivery Mechanism for Printing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to the delivery of the sheets issuing from a web printing and severing mechanism, and particularly to that method of delivery by which two or more of the successively-produced sheets are associated to form a single product.

The invention consists broadly in causing the rear sheet or sheets during some portion of its or their travel through the delivery mechanism to move at a greater speed than the advance sheet, so that the sheets will be caused to overlap each other and eventually be imposed upon one another in proper register.

The invention also embraces a mechanism by which this result is accomplished, all of which will be hereinafter fully explained, and particularly pointed out.

The accompanying drawing, which includes so much of a delivery apparatus as is necessary to illustrate the present invention, shows in longitudinal vertical section one embodiment thereof.

Referring to said drawing, it is to be understood that the web of paper, after being perfected by any ordinary form of printing mechanism, is severed into sheets and the sheets separated from each other by any common means—as the well-known accelerated tapes and pulleys—so as to provide working-spaces between them in their line of travel, after which they are caused to enter the bite of the rolls 1 2.

Leading from the rolls 1 2 to the rolls 6 9 are two pathways of equal length, the entrances to which are controlled by a common oscillating switch, 16. The upper of these pathways is formed by the series of tapes 3 8 and the fixed guides 17. The first of these series of tapes passes around roll 1, over rolls 4 5, around roll 6, and returns over tightening-roll 7, while the second passes around rolls 4 and

5. The lower pathway is formed by the series of tapes 10 14, fixed guides 17 and 20, and roll 11. The first of these series of tapes passes around roll 2, beneath rolls 11 12, around roll 9, and returns under tightening-roll 13, while the second passes around rolls 15 and 12.

It is also to be understood that the various rolls just mentioned are connected with each other and with the printing mechanism or other source of power by suitable gearing or otherwise, so as to receive uniform and appropriate motion, and that the switch 16 is provided with the usual devices to cause it to oscillate at the proper times.

Located at a suitable point between the rolls 15 12 is a roll, (or series of pulleys,) 18, directly below which is a co-operating roll, (or series of pulleys,) 19. These two rolls, which are circumferentially grooved to permit the passage of the tapes 10 14, and have corresponding portions of their peripheries depressed or cut away, as shown, are so geared or otherwise connected with some moving part of the machine as to have a surface speed less than that of rolls 1 2 and tapes 10 14. As the leading end of the first sheet emerges from between the rolls 1 2 the switch 16 will be in position to cause it to enter the lower pathway, in which it will pass forward beneath roll 11 and guides 20 and enter between tapes 14 10, by which it will be carried forward between the depressed portions of rolls 18 19 until it arrives at the position shown. At or about this time the switch 16 will be moved, so as to guide the second sheet into the upper pathway, and the rolls 18 19 will have arrived at such position as to bring their full portions into biting contact, thereby grasping the sheet passing between them and reducing its speed to that of their surfaces. The sheet thus held by the rolls 18 19 will continue to be advanced slowly until its leading end arrives at the bite of the roll 12 and tapes 10, at which time the leading end of the following sheet, which has passed forward unretarded in the upper pathway, will have overlapped the first sheet and arrived at the bite of the roll 5 and the tapes 3. When the sheets are in this position the depressed portions of the rolls 18 19 will again come together, thereby releasing the first sheet and

permitting it to resume its normal speed, so that the two sheets will pass forward between guides 17 and tapes 3 10, meet each other, and issue together from between rolls 6 9, to be thereafter flown, folded, or further operated upon by any appropriate delivery apparatus. The switch 16 having at the proper time been again moved, the third sheet will be sent into the lower pathway, to be in like manner retarded, and so the operation will continue to be repeated.

It will be observed that the roll 15 is so positioned that the tapes 14 10 are slightly convergent, which fact prevents them from crowding upon and wrinkling the rear end of the sheet after it has been grasped by the rolls 18 19.

From the foregoing it will readily be seen that to effect the proper retarding of the sheets passing along the lower pathway the speed and structure of the rolls 18 19 must be proportioned to the length of the sheets and the working-spaces between them. Any increase in the length of the sheets or of the working-spaces makes a corresponding increase in the distance to be gained by the rear sheet, and vice versa. To provide for this, the retarding of the advance sheet must be varied. This can be accomplished in the structure shown by decreasing the speed of the rolls 18 19, which will increase the retarding in degree, or by lessening the extent of their depressed portions, which will increase it in duration, or both, and vice versa.

Although it is preferable that the retarding-rolls should have portions of their peripheries depressed, as shown, yet such depression is not absolutely essential. They may be made perfect rolls, so as to act upon the sheet during the whole of its passage between them, in which case, as the duration of their action will be extended, their speed can be proportionately increased. In such case it will of course be necessary to locate the retarding-rolls the full length of the sheet in the rear of the bite of the roll 12 and tapes 10.

When the retarding-rolls are provided with depressed portions, as in the present case, they may be located at any convenient point between the rolls 12 15, as they can be so timed in their movements as to release the sheet while it still extends between them; but even in this case it is preferable that they should be located about the length of the sheet to the rear of the bite of roll 12 and tapes 10, in order that they may act upon the sheet near its rear end.

The retarding-rolls, instead of being constructed as shown, may be perfect rolls, and be made to act intermittently upon the sheet by being moved periodically into and out of biting contact with each other.

The sheet in the lower pathway, instead of being simply retarded, may be completely arrested until the following sheet has arrived in a position abreast of it in the upper pathway, and then be released. It is, however, prefer-

able not to bring the sheet to a full stop, as it will resume its normal speed much more promptly when released if it has at that time a slight motion. For the same reason it is also advisable to so locate and time the retarding devices that simultaneously with their release of the sheet its forward end will be caught in the bite of the roll 12 and tapes 10.

It is evident that the leading sheet, instead of being retarded or arrested, may be allowed to pass forward at its normal speed, and the second sheet be acted upon by mechanism substantially like that shown, or by other suitable devices, so as to have its speed accelerated and cause it to overtake and become associated with the first, and that such method and mechanism would be broadly embraced in the present invention.

If at any time, instead of delivering the sheets associated in pairs, it should be desired to deliver them singly, it can readily be done in the mechanism shown by securing the switch 16 in the position shown in the drawing. All of the sheets will then be guided into the upper pathway and issue singly from between the rolls 6 9, to be acted upon in any desired manner.

If it should be desired to associate more than two sheets, it can readily be done by increasing the number of the pathways and causing the leading sheets to be retarded or the rear sheets to be accelerated sufficiently to bring them all abreast at a common exit. The same result may also be accomplished by duplicating the apparatus and causing the succeeding pairs of sheets, as they emerge from between the rolls 6 9, to be guided into different pathways, where one pair will be retarded or accelerated, so as to bring the two pairs together at the final exit.

What I claim is—

1. The herein-described method of associating successive sheets in a delivery apparatus, which consists in varying the speed of certain of the series of sheets to be associated until all are abreast, and then causing all to progress at a uniform speed, substantially as described.

2. The herein-described method of associating successive sheets in a delivery apparatus, which consists in retarding the speed of the leading sheet until a following sheet is abreast thereof, and then causing both to progress at a uniform speed, substantially as described.

3. The herein-described method of associating successive sheets in a delivery apparatus, which consists in causing said sheets to enter different pathways of equal length and varying the speed of certain of the sheets of the series to be associated until all are abreast, and then causing all to progress at a uniform speed, substantially as described.

4. The herein-described method of associating successive sheets in a delivery apparatus, which consists in causing said sheets to enter different pathways, and then retarding the speed of the advance sheet until a following sheet is abreast thereof, and then causing both to pro-

gress at a uniform speed, substantially as described.

5 5. The combination, with a series of pathways of equal length, of means for guiding successive sheets into different pathways and means for causing the sheets in the several pathways to travel at different average speeds, whereby the several sheets are brought abreast of each other at a common exit, all substantially
10 as described.

6. The combination, with a series of pathways of equal length, of means for guiding successive sheets into different pathways and means for retarding the speed of the advance

sheet until the following sheet is abreast thereof, substantially as described. 15

7. The combination, with a series of pathways of equal length, of a switch, as 16, and retarding-rolls, as 18 19, substantially as described. 20

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

LUTHER C. CROWELL.

Witnesses:

T. H. PALMER,
GEO. H. GRAHAM.