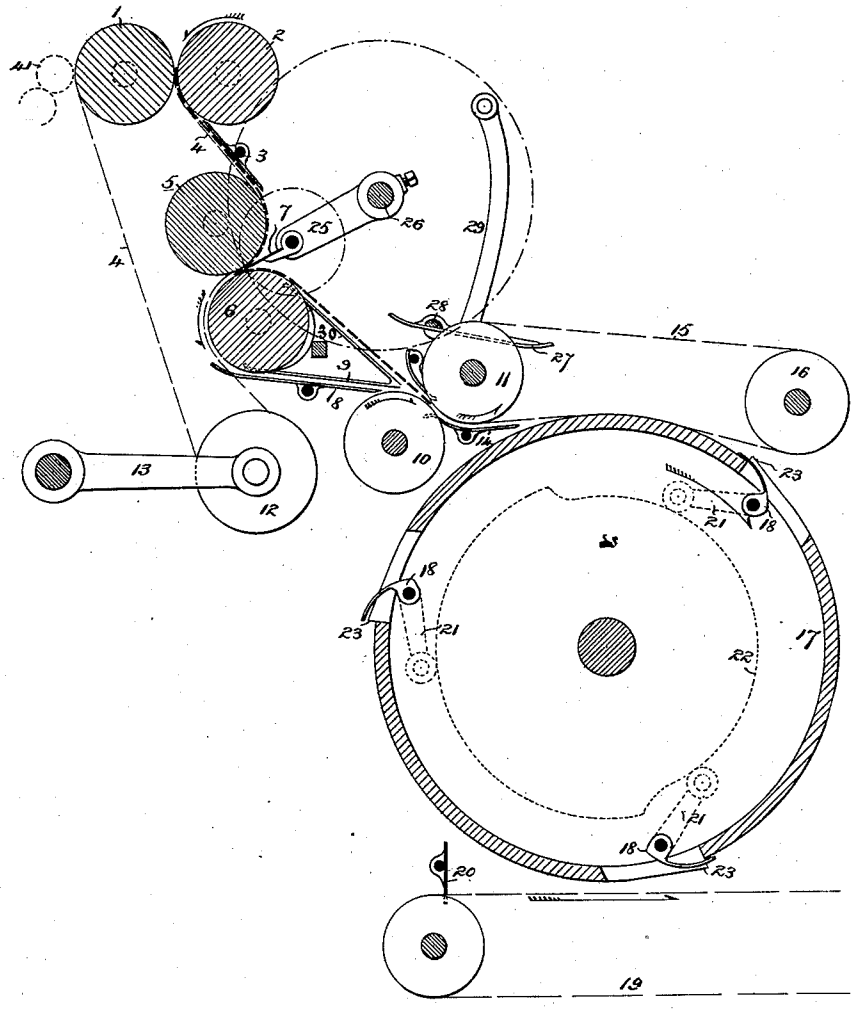
(No Model.) 4 Sheets—Sheet 1.

L. C. CROWELL.

SHEET DELIVERY APPARATUS.

No. 281,754. Patented July 24, 1883.

Fig. 1.



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N. PETERS, Photo-Lithographer, Washington, D. C.

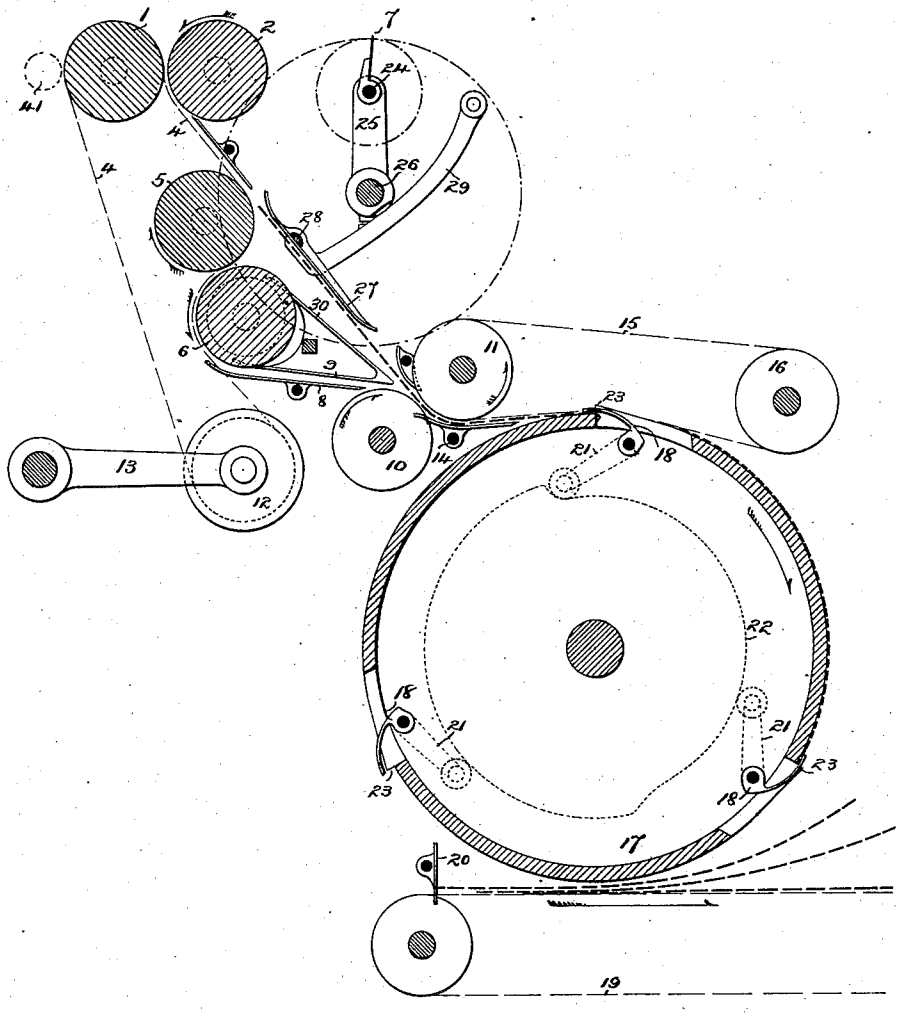
(No Model.) 4 Sheets—Sheet 2.

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Fig. 2



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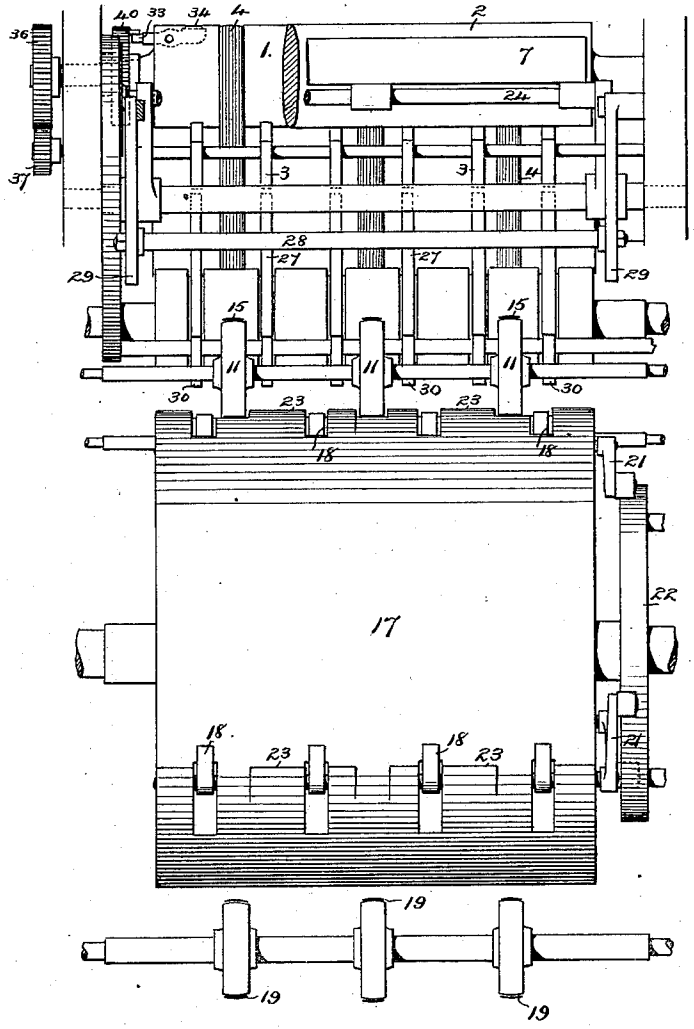
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Fig. 3.



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(No Model.) 4 Sheets—Sheet 4.

L. C. CROWELL.

SHEET DELIVERY APPARATUS.

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Fig. 6.

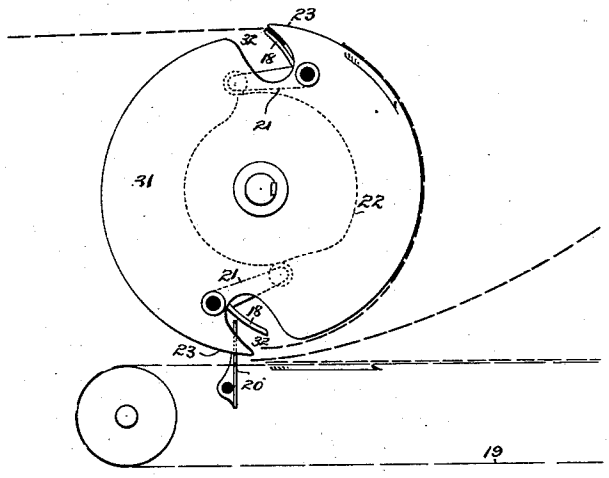


Fig. 7.

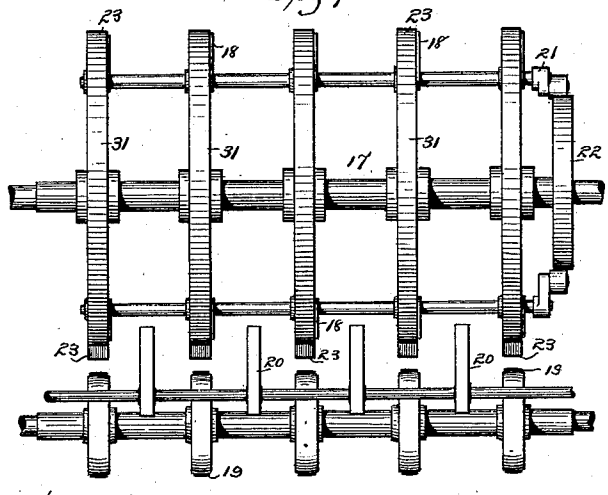


Fig. 4.

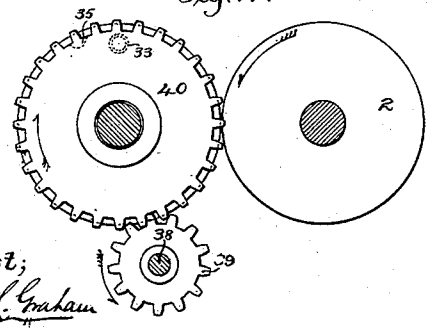
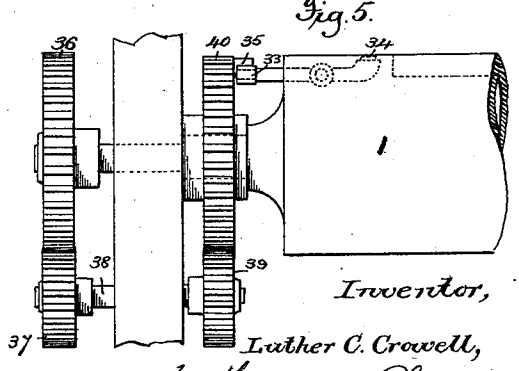


Fig. 5.



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UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF BROOKLYN, ASSIGNOR TO R. HOE & CO., OF NEW YORK, N. Y.

SHEET-DELIVERY APPARATUS.

SPECIFICATION forming part of Letters Patent No. 281,754, dated July 24, 1883.

Application filed August 25, 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 Apparatus, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

In the production of ordinary newspapers it is frequently desirable to have an edition or issue delivered from the printing mechanism in two different forms—that is to say, a portion folded to a form suitable for the carrier or for street or counter sale, and the remainder still further folded, so as to be reduced to a size or form suitable to be wrapped or bundled for the mail.

The present invention relates to a sheet-delivery apparatus adapted to accomplish this result, it being the object of the invention to produce a final-delivery mechanism, which, receiving the sheets after they have been operated upon by any appropriate folding mechanism, so as to be reduced to a form or size suitable for the carrier, is capacitated to deliver them from the machine in that condition, or, by slight adjustments, to impart an additional fold and deliver them in a reduced size suitable for the mail, they being in both cases placed upon the same receiver.

In said drawings, Figure 1 is a longitudinal section of a mechanism embodying the invention, the parts being shown as adjusted to impart the additional fold and deliver the sheets in form for mailing. Fig. 2 is a like view, showing the parts adjusted to deliver the sheets without the additional fold, and in form for the carrier. Fig. 3 is a front elevation of the same. Figs. 4 and 5 are details upon an enlarged scale, showing devices for printing an indicating-mark upon certain of the sheets. Fig. 6 is a side elevation of a modified form of the final-delivery carrier, and Fig. 7 is a front elevation of the same.

The sheets, having been printed and folded to dimensions suitable for the carrier, pass between the rolls 1 2, which may be simply feeding-rolls, or may be the last pair of folding-rolls, which act upon the sheets to reduce them to carrier form. After passing these rolls the sheets are conducted downward between guides 3 and the series of endless tapes 4 to a position in front of the folding-rolls 5 6. The tapes 4, after passing around the roll 1, pass over roll 5, between it and roll 6, and return around tension-pulleys 12, which are mounted upon the ends of loose arms 13, and rest in the bight of the tapes with a yielding pressure. As the fold-line of each sheet arrives in proper position it will be struck by the rotating folding-blade 7 and folded into the bite of the rolls 5 6, as shown in Fig. 1, after which the sheets, which, by this fold, are reduced from carrier size to mail size, will pass around upon roll 6, they being held to the roll by the tapes 4, and be projected forward between guides 8 9 into the bite of the feeding-pulleys 10 11, by which they are then advanced between guides 14 and tapes 15, passing around pulleys 11 16, onto the surface of the delivery-carrier 17. As the successive sheets pass onto the carrier 17 they are taken by the grippers 18 and carried around upon said carrier until deposited upon a piling-table, to be removed by an attendant, or in front of the stop 20 upon the slowly-moving tapes or apron 19, by which they are carried to any convenient distance from the machine.

The grippers 18 are operated to grasp and release the leading ends of the sheets at the proper times in the usual manner—that is to say, by rock-arms, as 21, which are acted upon by a stationary cam, as 22, to open them, and by springs, (not shown,) which close them when the shape of the cam permits; or they may be actuated by any of the other devices commonly employed for that purpose.

The carrier 17, instead of being provided with grippers, may be provided with pins, which will operate in the manner shown in United States Letters Patent No. 255,723, to retain the sheets upon its surface.

The carrier 17 is provided at points just in advance of the positions occupied by the heads or leading ends of the sheets when upon its surface with projections 23, which operate, as the sheets accumulate upon the piling-table or tapes, to press the sheet last deposited away from the carrier, so as to permit the head of the incoming sheet to be carried forward without fouling.

The folding-blade 7, although it may be of

any of the common constructions, is here shown as arranged and operated in the manner shown and described in United States Letters Patent No. 171,196, except that its shaft 24, instead of being mounted in the heads of a solid or continuous cylinder, has its bearings in arms 25, extending from a shaft, 26, corresponding to the shaft of the blade-cylinder in the patent referred to. When it is desired to deliver the sheets without the final fold just described, the folding-blade 7 will be rendered inoperative, either by the removal of its driving-gear or in any other convenient manner, and its carrying-arms will be secured in substantially the position shown in Fig. 2.

The guides 27, supported upon a cross-bar, 28, fixed in the ends of the swinging arms 29, will then be moved from the position shown in Fig. 1 to that shown in Fig. 2, so as to form, in connection with guides 30, a direct pathway for the sheets from rolls 1 2 to pulleys 10 11, by which latter they will be advanced onto the surface of the carrier, to be taken by the grippers and deposited upon the tapes 19 in the manner already explained.

The carrier 17 will be made capable of adjustment with relation to its driving-gear, so that it can be shifted to bring its grippers 18 into proper position to receive the leading ends of the advancing sheets either with or without the final fold; or the path of travel of the mail-folded sheets may be made of such a length as to cause the head of each sheet to arrive upon the carrier in proper position for the grippers. When the sheets in being reduced to carrier form have, as is usually the case, received one or more transverse folds, they will, as will be readily understood, emerge from the rolls 1 2, separated from each other by spaces of considerable length. This being the case, the pulleys 10 11 and the carrier 17 may be proportionately reduced in speed, it being only necessary that the advance sheet shall be clear of the pulleys 10 11 before the next succeeding sheet enters their bite. When the sheets are thus reduced in speed, they may be brought to a full stop against the fingers 20 without danger of fouling or wrinkling.

In Figs. 6 and 7 the final-delivery carrier, instead of being a drum or cylinder, is shown as composed of a series of disks, 31, provided with recesses 32, into which the leading ends of the sheets enter as they pass from between guides 14 and tapes 15, and against one wall of which the grippers nip them. In this case, also, the action of the cam 22 is reversed, it serving to close instead of open the grippers. In all other respects the operation of this modified structure is the same as already set forth.

It is to be remarked that the number of sets of grippers with which the carrier 17 is provided is not material. It may have two, three, or even more sets, though it is thought that three sets will usually be found the most desirable number.

It is to be remarked that the final-delivery carrier herein shown may be used in connection with other forms of folding and delivery apparatus than that shown—such, for example, as a gathering mechanism—and also that the sheets may be delivered from the folding apparatus shown in the present case to a fly or other form of sheet-laying device.

In the production of newspapers it is frequently desirable to indicate regular divisions in the pile of sheets delivered from the printing mechanism, so that any desirable number can be readily taken from the pile without the necessity of counting. This is done in the present case by printing an indicating-mark upon the blank margin of certain of the successive sheets during their passage between the rolls 1 2. To this end the roll 1 is provided at one end with a longitudinal recess, in which is pivoted an arm, 33, the inner end of which is provided with a printing-surface, 34, bearing any design which it is desired to impress upon the blank margins of certain of the papers. The arm 33 is so controlled by a spring or otherwise that the printing-surface 34 is normally held within the periphery of the roll 1 and out of operative position. The outer end of the arm 33, however, extends beyond the end of roll 1, and is at regular intervals brought into contact with a rotating cam, 35, by which the arm is rocked, so that the printing-surface 34 is projected outside the periphery of roll 1, so as to print a mark upon the sheet at that time passing.

The mechanism by which the cam 35 is operated to produce this result is as follows: The outer end of the shaft of roll 1 is provided with a fixed gear, 36, which engages with a gear, 37, fixed upon a short shaft, 38, upon the opposite end of which is another fixed gear, 39, slightly larger than gear 37, which engages with a gear, 40, slightly smaller than gear 36, which is mounted loosely upon the shaft of roll 1, and carries upon its face the cam 35. It will now be readily seen that, if the gears 36 40 and the gears 37 39 were of the same size the gear 40 and cam 35 would remain stationary with relation to the roll 1, and the printing-surface 34 would always remain within the periphery of the roll; but as gear 40 is slightly smaller than gear 36, and gear 39 proportionately larger than gear 37, it follows that gear 40 and cam 35 will revolve slowly around the shaft of roll 1, so as to bring the cam 35 periodically into contact with the arm 33, to project the printing-surface 34 beyond the periphery of the roll. From this it will be seen that by making these gears of the proper relative sizes the printing-surface 34 can be thrown into operative position at every fifth, tenth, twenty-fifth, fiftieth, or other desired revolution of the rolls 1 2, so as to print the indicating-marks upon every fifth, tenth, twenty-fifth, fiftieth, or other paper in the series, as may be desired.

It is to be remarked that the cam 35 will be made of such an extent that the printing-surface will be held outside the periphery of the roll 1 a sufficient length of time to allow it to

take ink from some suitable inking mechanism—as, for instance, an inking-roll, as 41—before it comes into contact with the sheet.

It is of course to be understood that in the present apparatus the parts will be so timed that the indicating-mark will be printed upon the rear ends of the sheets or in some other exposed position, so that said marks can be readily seen as the sheets pass away from the machine upon the tapes 19.

The frame-work of the machine, as well as the gearing by which the principal moving parts are driven, have not been shown or described in the present case, as the manner of properly constructing and arranging such parts is within the knowledge of all persons familiar with the art.

The projections 23, instead of being fixed upon the carrier 17, may be provided by so forming the grippers 18 that their outer surfaces will perform the same functions as said projections.

The combination, with a sheet feeding and folding mechanism, which is adapted to deliver sheets in different forms or conditions, of a single-sheet-laying mechanism, which is adapted to receive and lay the sheets in either of their forms or conditions, is not herein claimed, as such a mechanism will be shown, and, so far as novel, claimed in a future application for Letters Patent.

What I claim is—

1. The combination, with a sheet-manipulating mechanism—such, for example, as a folding or gathering mechanism—of a sheet-laying mechanism consisting of a rotating carrier, as 17, provided with means for grasping and retaining the leading ends of the sheets and for releasing them at the proper points, and means for advancing the leading ends of the sheets from the first mechanism to the laying mechanism, all substantially as described.

2. The combination, with a sheet-manipulating mechanism—such, for example, as a folding or gathering mechanism—of a sheet-laying mechanism consisting of a rotating carrier, as 17, having a surface speed less than that of the first mechanism, and provided with means for grasping and retaining the leading ends of the sheets and for releasing them at the proper point, and means for advancing the leading ends of the sheets from the first mechanism to the laying mechanism, all substantially as described.

3. The combination, with a sheet-manipulating mechanism—such, for example, as a folding or gathering mechanism—of a sheet-laying mechanism consisting of a rotating carrier, as 17, having a speed less than that of the first mechanism, and provided with means for grasping and retaining the leading ends of the sheets and for releasing them at the proper point, and means for pressing the successively-delivered sheets away from itself, and means for advancing the leading ends of the sheets from the first mechanism to the laying mechanism, all substantially as described.

4. The combination, with a delivery-carrier, as 17, provided with grippers, as 18, and projections, as 23, of feeding rolls or pulleys, as 10 11, for advancing the leading ends of the sheets to said grippers, substantially as described.

5. The combination, with a sheet-laying mechanism consisting of a rotating carrier, as 17, provided with means for grasping and retaining the leading ends of the sheets and for releasing them at the proper point, of the slowly-moving tapes or apron 19, all substantially as described.

6. The combination, with a sheet-laying mechanism consisting of a rotating carrier, as 17, provided with means for grasping and retaining the leading ends of the sheets and for releasing them at the proper point, and means for pressing the successively-delivered sheets away from itself, of the slowly-moving tapes or apron 19 and the stops 20, all substantially as described.

7. The combination, with a sheet-feeding mechanism and a sheet-laying mechanism, of the intermediate folding-rolls, 5 6, and rotating blade 7, provided with means by which it may be rendered inoperative, and movable guides, as 27, and fixed guides, as 8 9 30, forming pathways for conducting the sheets to said laying mechanism, either with or without the final fold, all substantially as described.

8. The combination, with the roll 1, provided with the pivoted arm 33, of the gear 40, carrying the cam 35, and the gears 37, 39, and 36, substantially as described.

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

LUTHER C. CROWELL.

Witnesses:
J. A. HOVEY,
T. H. PALMER.