

(No Model.)

3 Sheets—Sheet 1.

C. CHAMBERS, Jr.
COMBINED PRINTING AND FOLDING MACHINE.

No. 477,886.

Patented June 28, 1892.

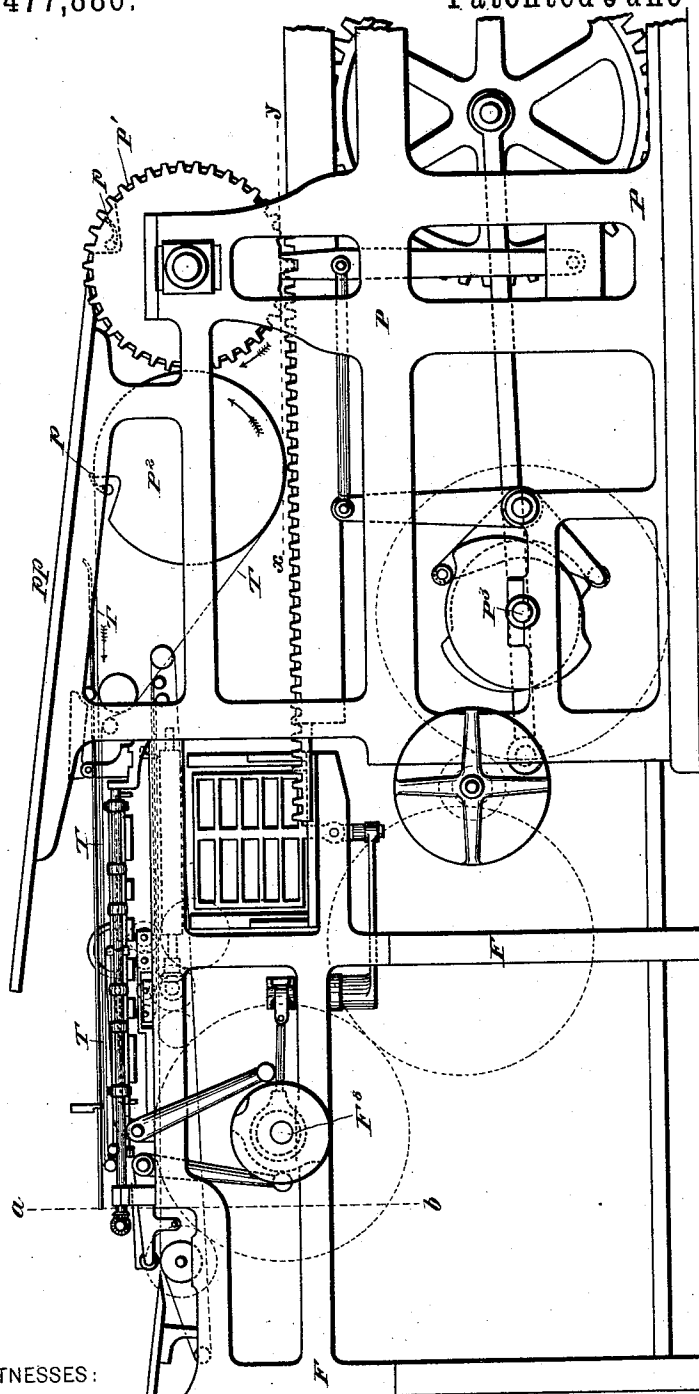


Fig. 1.

WITNESSES:

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INVENTOR

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per
Joshua Dusey
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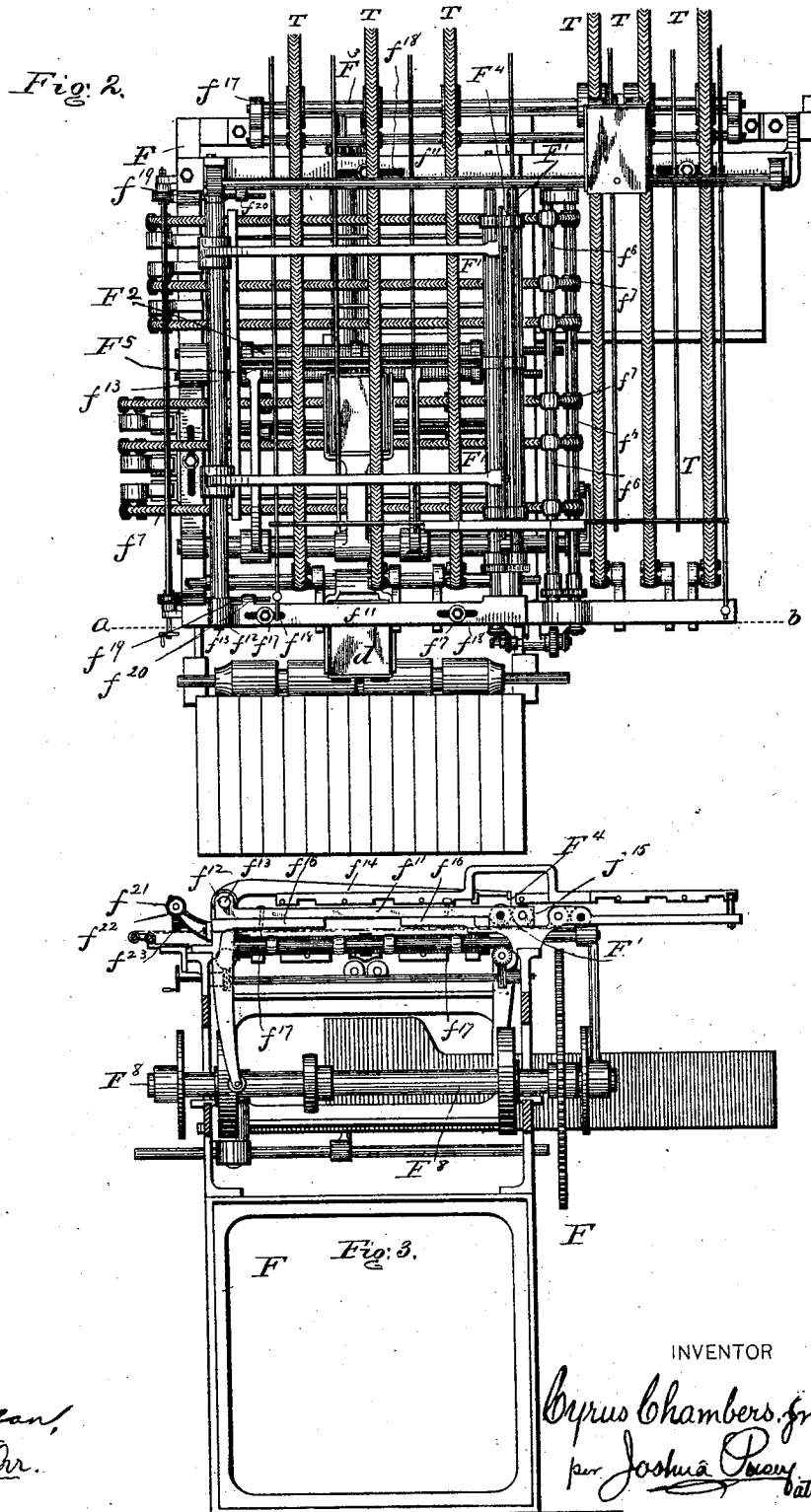
(No Model.)

3 Sheets—Sheet 2.

C. CHAMBERS, Jr.
COMBINED PRINTING AND FOLDING MACHINE.

No. 477,886.

Patented June 28, 1892.



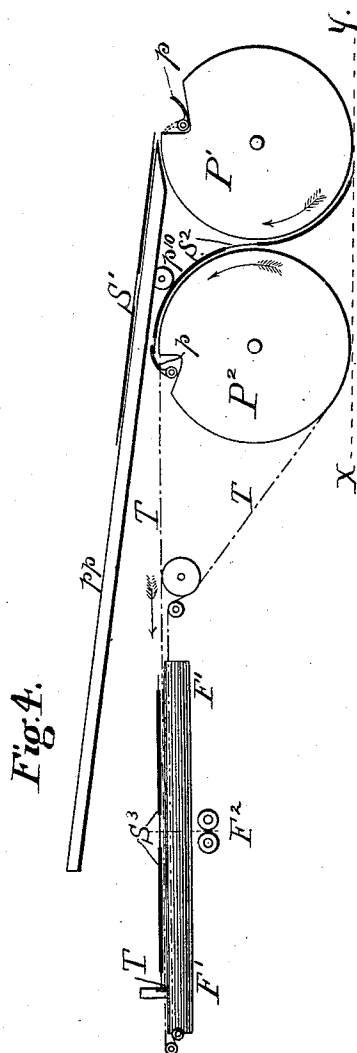
(No Model.)

3 Sheets—Sheet 3.

C. CHAMBERS, Jr.
COMBINED PRINTING AND FOLDING MACHINE.

No. 477,886.

Patented June 28, 1892.



WITNESSES:

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UNITED STATES PATENT OFFICE.

CYRUS CHAMBERS, JR., OF PHILADELPHIA, PENNSYLVANIA.

COMBINED PRINTING AND FOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 477,886, dated June 28, 1892.

Application filed June 12, 1885, Serial No. 163,439. (No model.)

To all whom it may concern:

Be it known that I, CYRUS CHAMBERS, JR., a citizen of the United States, residing in the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in a Combined Printing and Folding Machine, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, of which—

Figure 1, Sheet 1, is a side elevation of the folding, pasting, and covering machine and the rear part or delivery end of an ordinary "stop-cylinder" printing-press. Fig. 2, Sheet 2, is a plan view of the folding-machine, showing the arrangement of the folding-rollers and blades, paste-pots for pasting a sheet of sixteen pages, and the cover-attaching devices. The cam or main shaft, with its gearing, is for greater clearness omitted, also the tapes to the third folding-rollers and the plungers for the packing-trough. Fig. 3, Sheet 2, is a sectional end elevation, as on line *a b*, Figs. 1 and 2, showing the main cam-shaft *F*⁸ with its gearing and the packing device, but omitting that portion of the cover paste-pot *d*, Fig. 2, cut through by said section-line, together with its shaft. Fig. 4, Sheet 3, is a sectional side elevation of the feed-table, printing or impression cylinder, and the delivery-cylinder of the printing-press, the delivery-tapes and the first and second pairs of folding-rollers of the folding-machine, showing also the positions of the sheets when the printing-cylinder is at rest.

This invention relates to the combination, with a printing-press, of a folding (or a folding, pasting, and covering) machine in such a manner that the folder will fold the printed sheets in register with the matter printed on the sheets by the press.

The improvement is adapted to be applied in connection with that class of printing-presses in which the sheet comes to rest at intervals in its course through the machine—such as, for example, what are known as the "stop-cylinder," the "Kidder" printing-presses, and similar machines.

A leading feature of the invention has relation to the location of the folding devices relative to the printing devices, so that when the "perfected" sheet coming from the press

after the completion of both impressions and before the sheet has been let go of or allowed to shift or move in any uncertain distance or direction is brought to rest in such position relative to the folding-machine as to receive the action of the folder and be folded in certain lines or positions relative to the printed matter thereon irrespective of the edge of the sheet.

The invention also relates to the combination, with said combined printing-press and folding-machine, of means for accurately adjusting the several pairs of folding-rolls and their adjuncts in order to compensate for any misadjustment of the "form" on the printing-press or variation in the delivery of the sheet from the latter.

The invention also relates to certain details and combinations of mechanism, which will be hereinafter described, and pointed out in certain of the claims.

I shall now proceed to describe a means and mechanism whereby my invention is carried out, omitting particular reference to parts and devices that are well known in connection with printing-presses and folding-machines of the class mentioned, yet describing sufficient to enable one skilled in the art to which my invention pertains to understand and to put the same into practical operation.

Referring to the annexed drawings, *P* and *F* are the general frame-work of the printing and folding machines, respectively.

pp is the usual inclined feed-table of the press, *P'* the impression-cylinder, *P*² the delivery-cylinder, and *p* the grippers.

*F*¹ is the first pair of folding-rolls of the folding-machine, *F*² the second pair, and *F*³ the third pair.

*F*⁴ is the first and *F*⁵ the second folding-blade.

T are the tapes which convey the printed sheets from the press in position to be folded by the first pair of rolls, the usual overlying rods for aiding in retaining the sheet in place being omitted.

*f*⁶ are the rolls for carrying and propelling the tapes *f*⁷, which convey the supplement-sheet when necessary, as shown and set forth in a certain application for Letters Patent filed April 24, 1885, by William Mendham, Serial No. 163,259.

P³ is the main or driving shaft of the printing-machine, and F⁸ is the main or cam shaft of the folding-machine. The latter machine is coupled up to the printing-press, as seen in Fig. 1, so as to run in concert therewith, and its main shaft F⁸ makes one revolution to that of the cylinder P' of the press, or one revolution to every sheet printed.

It will be observed that the feed-table *pp* of the printing-press extends over a part of the folding-machine and that the folding-rollers are above the bed-line *xy* of the press. This construction or arrangement is employed as a matter of economy to save the space, which is often a great desideratum in printing establishments.

If the folding-rollers were on or about a horizontal line with or below the bed-line of the press, the folding-machine would have to be removed to such a distance from the press delivery-cylinder (so as to be out of the way of the reciprocating bed) that the printed sheet would not be properly delivered to the first folding knife and rollers. This will appear by referring to Fig. 4, Sheet 3, which represents the relative position of the sheets while the printing-cylinders are at rest. The tapes T during the rotation of the cylinders have carried the sheet S³ and maintained it in the same position relative to the printing thereon a certain distance and to a certain precise point, which is that at which the first folding devices operate. Now if the folding-machine were removed, say, but the fraction of an inch to the right or to the left it would practically destroy the usefulness of the folder in that connection. If, however, it be removed to a distance from the printing-press equal to twice the distance relatively of that shown in Fig. 4, then the printed sheet would be brought to the proper position with relation to the folding-machine at the second stage of its movement—that is, at the second stop of the press-cylinders after the sheet has left the latter; but to locate the folder at such a distance from the printing-press would result in the loss of a considerable space, which usually cannot be well spared in printing establishments.

I will now proceed to describe the operation of the invention, special reference being had to Figs. 1 and 4. S', Fig. 4, is a sheet on the feed-board *pp*, printed on one side only, as indicated by the heavy line underneath opposite or corresponding with each printed page. S² is the preceding sheet, which has just been printed on the second side and held between the impression and delivery cylinders P' and P² by the small binder-roller *p*¹⁰. The printed pages on this sheet are indicated by heavy lines on both sides. S³ is a third sheet seen delivered by the tapes T from the printing-press in position to be acted upon by the folding-machine—that is to say, "in register." The first pair of folder-rollers F' and the second pair F² are seen in said Fig. 4, the folding-blades and other mechanism being omitted. The positions represented by these

three printed sheets S', S², and S³ are those successively assumed by each and every sheet in its passage through the printing-press at the instant of rest of the impression-cylinder.

It will be obvious that if the folding device were located at some other point than that required to act upon the printed sheet at the time of its rest in its passage through and from the machine accurate register would not be secured, and hence the importance of its precise position relative to the sheet while in position.

To perfect my invention and more fully carry its purposes and to facilitate the obtaining of accurate register, I construct the first and second pair of folding-rollers, together with their respective blades, shafts, and boxes carrying the same, so as to be adjustable with relation to the center lines of the printed pages, so that if there be a slight misadjustment of the form in the press or any variation in the delivery of the sheet these folding devices can be nicely adjusted to suit the occasion and absolutely "perfect register" obtained. A means for accomplishing such adjustments are as follows, special reference being had to Figs. 2 and 3, Sheet 2. *f*¹¹ are sliding pieces, to a projection *f*¹² of which is pivoted the shaft *f*¹³ of the folding-blade arm *f*¹⁴, and which carry at their opposite ends the boxes or bearings *f*¹⁵ of the shafts of the folding-rollers F'. Said sliding pieces rest upon cross-beams *f*¹⁶ of the frame of the folding-machine, and are held adjustably in place by means of bolts *f*¹⁷, passing through longitudinal slots *f*¹⁸, said bolts being screwed or tapped into the beams *f*¹⁶. By loosening said bolts the rollers F' and their folding-blade, shafts, and boxes as a whole may be adjusted to the desired position. To facilitate such adjustments, I make use of screws *f*¹⁹, working in lugs *f*²⁰ in the side of the sliding bars *f*¹¹. Said screws are rotated in either direction by means of a worm-wheel *f*²¹ on a crank-shaft *f*²², said worm engaging with a gear-wheel *f*²³ on the outer end of the screw *f*¹⁹. Such adjusting devices, *per se*, are not new. The same construction for a similar purpose is used in connection with the second pair of rollers when it is necessary to secure accurate register in a transverse direction.

Having thus described my invention so that those familiar with the art to which the same pertains are enabled to construct and practice the same, I claim as new and desire to secure by Letters Patent—

1. The combination of the stop-cylinder printing-press and the folding-machine arranged and driven with relation to each other, as shown and specified, together with the tapes arranged and adapted to operate to convey the printed sheets from the press to the folding-machine, so as to be in register with the first folding devices at the instant the sheet is brought to rest by the stopping of the cylinder of the printing-press, substantially as and for the purpose set forth.

2. The combination, with a folding-machine and printing-press of the class recited, with means, such as the tapes, for conveying the printed sheets from the printing-machine to the folding-machine, of laterally-adjustable first folding-rollers and folding-blade whereby compensation may be made for inaccurate lateral adjustments of the form on the printing-press, substantially as and for the purpose set forth.

3. The combination of a folding-machine and a printing-press of the class recited, having its second set of folding-rolls and folding-blade adjustable to and from the printing-press to compensate for inaccurate placement of the form lengthwise of the press or the distance the sheets may be carried by the press, substantially as and for the purpose set forth.

4. In a combined folding-machine and printing-press of the recited class, the combination therewith of the first and second adjustable

folding rollers and blades for the purpose of obtaining accurate register in printed sheets delivered directly from the printing-press, substantially as and for the purpose described.

5. The combination of the stop-cylinder printing-press and folding-machine in relation to each other, as shown and described, the mechanism for operating said press and machine concertedly, and the tapes for conveying the printed sheets from the press to the folding-machine, all constructed and adapted to operate substantially as and for the purposes set forth.

In testimony whereof I have hereunto affixed my signature this 10th day of June, A. D. 1885.

CYRUS CHAMBERS, JR.

Witnesses:

FRANCIS S. BROWN,
JNO. NOLAN.