Oct. 6, 1931. A. ROSENTHAL 1,825,821

APPARATUS AND PROCESS FOR PRINTING LETTERHEADS

Filed Nov. 8, 1928 5 Sheets-Sheet 1

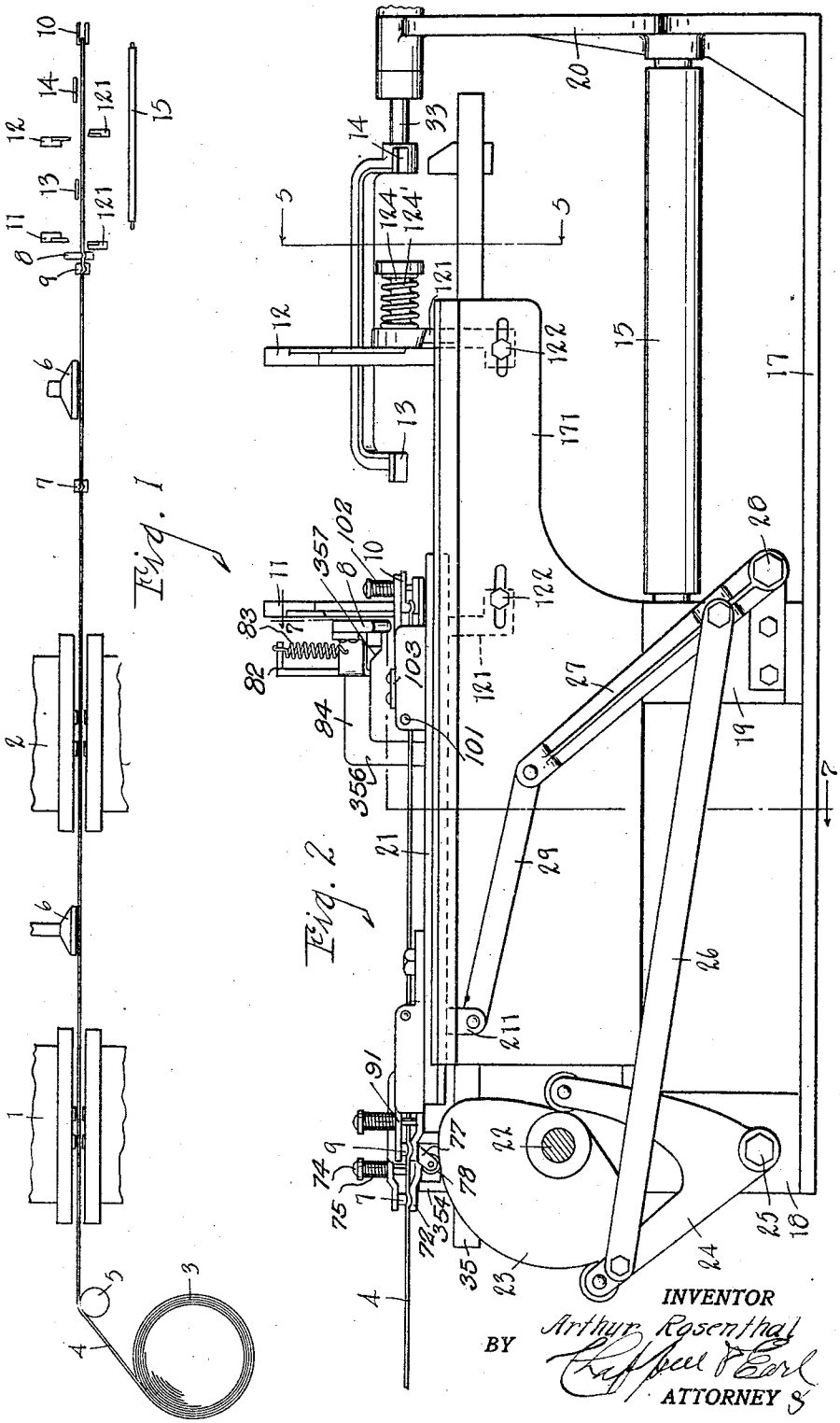


Fig. 1

Fig. 2

INVENTOR
Arthur Rosenthal
BY
ATTORNEY

Oct. 6, 1931. A. ROSENTHAL 1,825,821

APPARATUS AND PROCESS FOR PRINTING LETTERHEADS

Filed Nov. 8, 1928 5 Sheets-Sheet 2

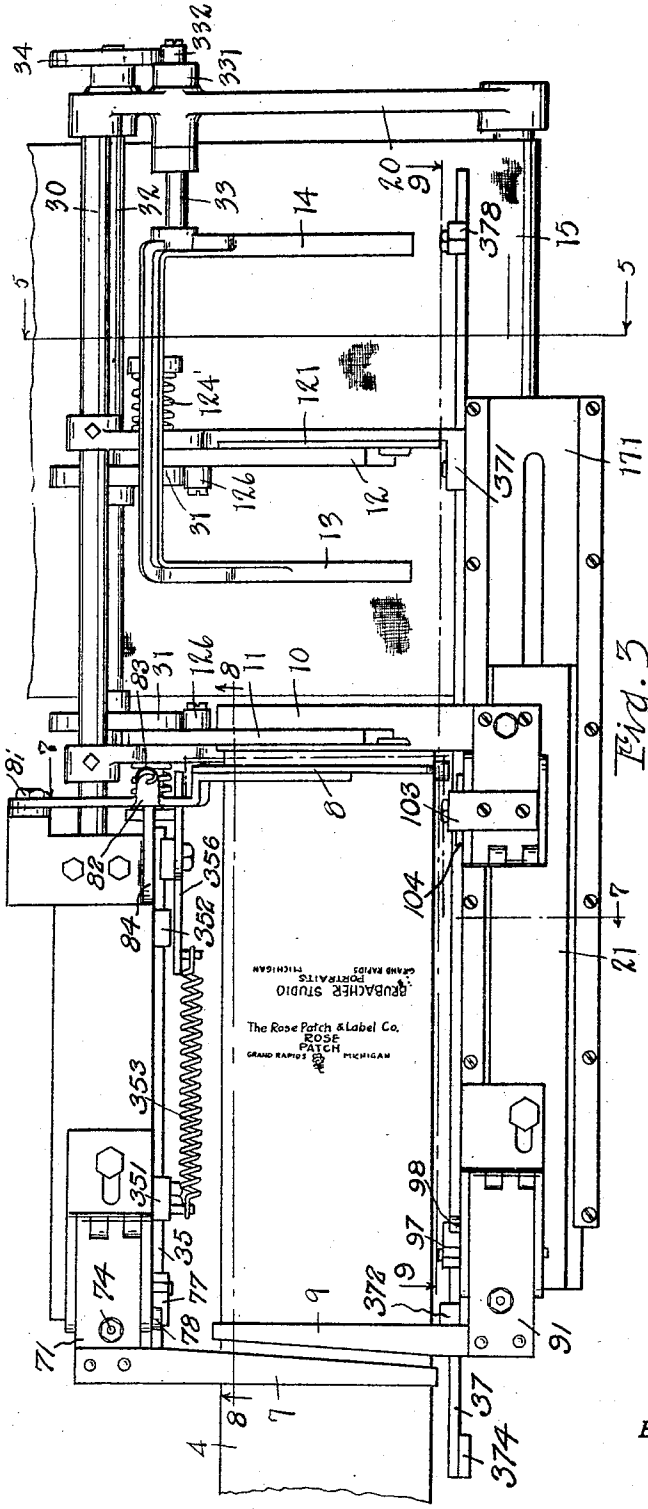


Fig. 3

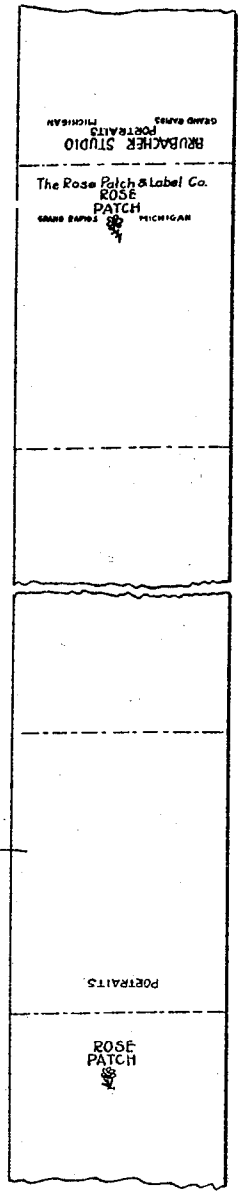


Fig. 4

INVENTOR
Arthur Rosenthal
BY Clapp & Earl
ATTORNEYS

Oct. 6, 1931. A. ROSENTHAL 1,825,821

APPARATUS AND PROCESS FOR PRINTING LETTERHEADS

Filed Nov. 8, 1928 5 Sheets-Sheet 3

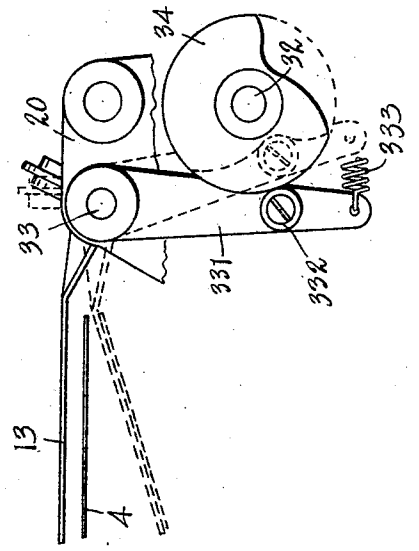
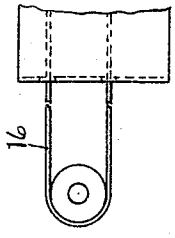


Fig. 6



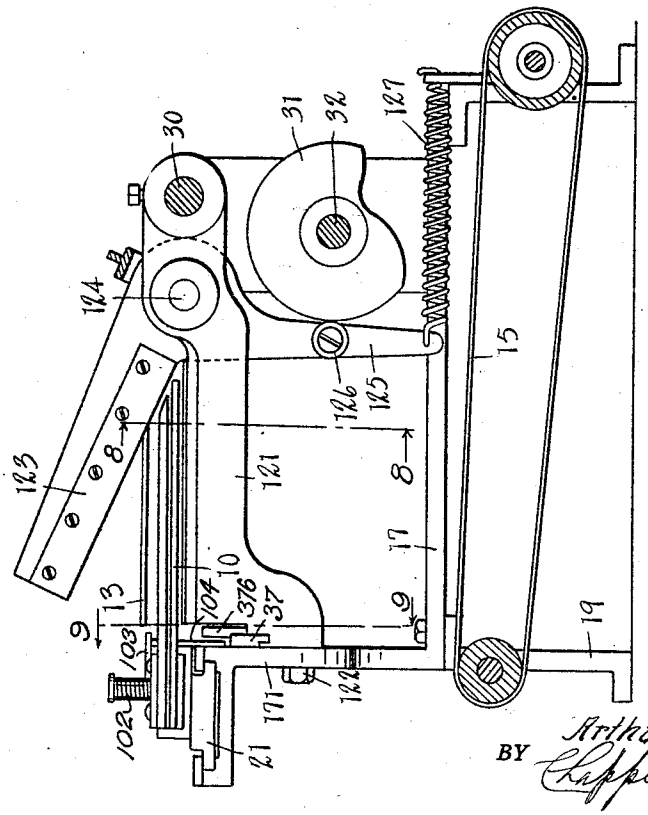


Fig. 5

INVENTOR
Arthur Rosenthal
BY Chappell & Earl
ATTORNEYS

Oct. 6, 1931. A. ROSENTHAL 1,825,821

APPARATUS AND PROCESS FOR PRINTING LETTERHEADS

Filed Nov. 8, 1928 5 Sheets-Sheet 4

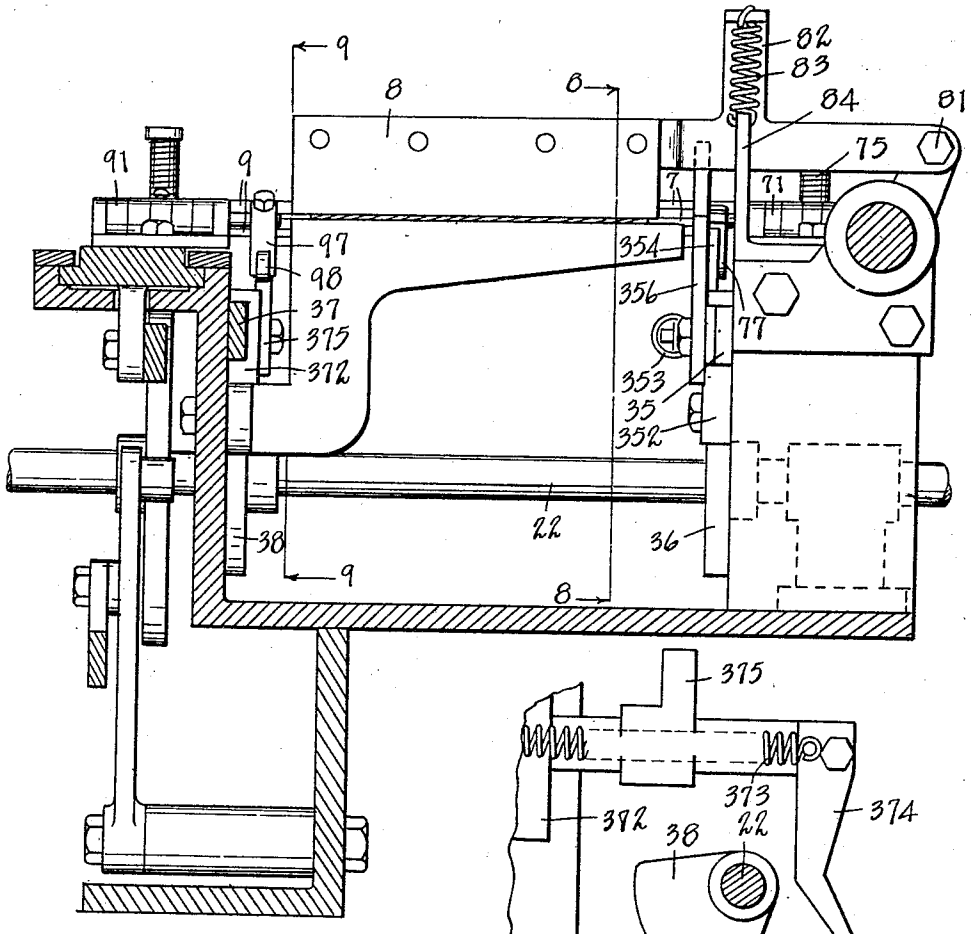


Fig. 7

Fig. 9a

INVENTOR
BY Arthur Rosenthal
Chappell & Earl
ATTORNEYS

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APPARATUS AND PROCESS FOR PRINTING LETTERHEADS

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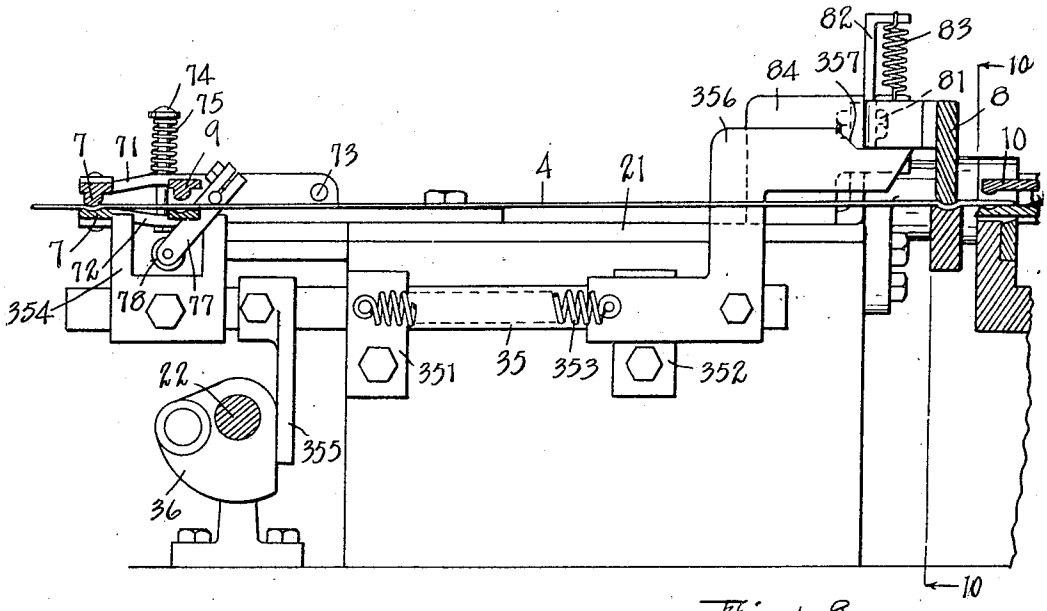


Fig. 8

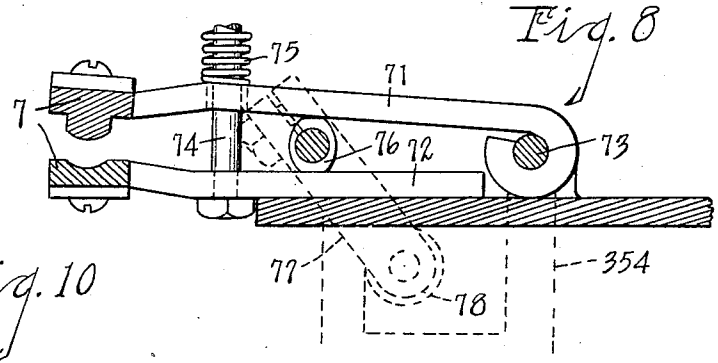


Fig. 10

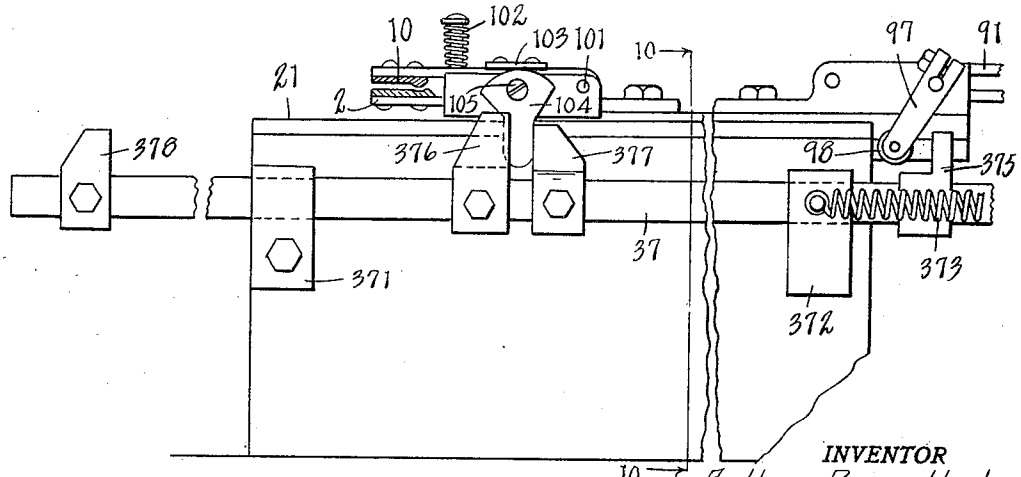


Fig. 9

INVENTOR
Arthur Rosenthal
BY Chappell & Earl
ATTORNEYS

Patented Oct. 6, 1931 1,825,821

UNITED STATES PATENT OFFICE

ARTHUR ROSENTHAL, OF GRAND RAPIDS, MICHIGAN

APPARATUS AND PROCESS FOR PRINTING LETTERHEADS

Application filed November 8, 1928. Serial No. 317,906.

This invention relates to improved printing apparatus and process for printing letterheads and the like on a web from a roll of paper.

The objects of the invention are:

First, to provide for rapid printing on a web from the roll of engraved letter heads or the like, either in single or multi-color.

Second, to provide improved means of feeding a web from the roll to a multiple of presses for multiple color work.

Third, to provide improved means of feeding, printing and cutting a plurality of sheets from a web.

Fourth, to provide improved means and method of printing a plurality of letter heads or the like on a web from a roll and cutting the same into sheets.

Fifth, to provide improved means of handling a web from the roll of multiple color printing.

Objects relating to details will appear from the detailed description to follow. The invention is defined in the claims. A structure embodying the features of my invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a diagrammatic elevation view of the printing presses and feed and cutting apparatus made use of in carrying out my invention.

Fig. 2 is a side elevation view of the feed and cutter mechanism employed, the actuating cam for the paper throw-out means being omitted, and the driven shaft being in section.

Fig. 3 is a plan view of the said feed and cutter mechanism.

Fig. 4 is a plan view of the web of paper, a part of its length being broken out, showing the method of multi-color printing on a plurality of letterheads from a web.

Fig. 5 is an enlarged detail transverse elevation taken on line 5—5 of Figs. 2 and 3 of the cutter mechanism and paper throw-out from the machine.

Fig. 6 is an enlarged detail elevation view of the throw-out actuating cam and means taken from the right hand end of Fig. 3, the dotted lines showing actuation.

Fig. 7 is an enlarged detail sectional elevation on line 7—7 of Figs. 2 and 3.

Fig. 8 is an enlarged detail longitudinal sectional elevation on line 8—8 of Figs. 3 and 7.

Fig. 9 is a broken detail sectional elevation taken on line 9—9 of Figs. 3 and 7.

Fig. 9A is a sectional view of the end portion of the structure illustrated in Fig. 9, taken on the same plane.

Fig. 10 is an enlarged detail sectional view of one pair of jaws with the actuating and holding cam therefor, the relation of the trip arm and its actuating means being indicated by dotted lines.

The parts will be identified by numerals of reference which are the same in all the views.

1 and 2 are inverted die presses such as are made use of for printing engraved letterheads or the like, these being located in spaced relation to each other. 3 is the paper roll delivering the web 4 of paper over the guide roll 5 to the printing presses. 6, 6 are jet delivery means for delivering air to the upper side of the web to dry the ink when necessary. 7 and 8 are pairs of holding jaws for the web of paper. 9 and 10 are the feed jaws for advancing the sheet. 11 and 12 are the cut off shears for severing the sheet. 13 and 14 are the throw-out fingers for discharging the severed sheets. 15 is the endless discharge conveyor and 16 is the conveyor to the drier.

To make clear the purpose of the machine, I state the example illustrated: The letterheads here being printed are

"The Rose Patch & Label Co.
ROSE
PATCH
Grand Rapids, Michigan."

and

"Brubacher Studio,
PORTRAITS
Grand Rapids, Michigan."

It is desirable to print the words "Rose Patch" and the figure and the word "Portraits" in red. These are set up in press No. 1 in opposed relation, as seen at the left in

Fig. 4. In press No. 2 blue or other color is set up to properly register and complete the letterhead, as seen at the right hand of Fig. 4, where the balance of both letterheads have been added. Letterheads are frequently printed on sheets 8½ inches by 11 inches which will be referred to as the example here. The heads of the sheets are toward each other in this printing, as seen in Figs. 3 and 4. This enables the comparatively small dies used on letterheads to be made use of in pairs and secure full benefit of a press of comparatively small size in thus making letterheads.

These presses are spaced from each other precisely a multiple length of the sheets being printed; that is, for an eleven inch sheet the presses are spaced 22 inches or 44 inches, preferably a double letterhead length, between the presses, although this can be increased to any multiple of that to give time for an initial drying of the ink as the web is being fed through the presses.

On small work, such as business cards, it is feasible to print by double or multiple sets of dies in the same press. Of course, a large press could be made for handling multiples of letterheads. It is found feasible and practical and more economical to use a plurality of presses (such being readily obtainable in the open market), which are timed to operate together as one press.

Where the presses are thus separated, it is preferable to deliver an air drying current through the nozzle 6 on the web to hasten the drying. This, however, with many of the modern inks, such as lacquer inks, is unnecessary. The web is disposed through the presses and inserted in the feed mechanism which draws the web through the presses with a definite predetermined step-by-step movement. This is accomplished by providing two pairs of holding jaws 7 and 8 in which the web is disposed and two pairs of feed jaws 9 and 10 for supporting and advancing the sheet in definite fixed relation to the plurality of cut off shears 11 and 12. The holding jaws 7 and 8 are supported in fixed relation on the feeding machine.

The reciprocating feed jaws 9 and 10 are supported on a slide 21 on the machine and are adapted to open and close, properly timed with the action of the printing presses.

The machine comprises a base 17 with supporting brackets 18, 19, and 20 thereon. The holding jaws 7 and 8 are fixed on the frame with suitable trip devices, timed for opening while the web is being fed through by the feed jaws, and closing to hold the web during the return of the feed jaws.

The pair of feed jaws 7 are supported on jaw carriers 71, 72 which are hinged together at 73, the lower carrier being stationary. They are held yieldingly in closed position by bolt 74 carrying the compression spring 75. A cam 76 with flattened ends is controlled by pivoted arm 77 which is provided with a roller 78 at its lower end. An actuating slide 35 is supported by guides 351, 352 and is urged to the left of the structure as seen in Fig. 8 by the coil spring 353. It is provided with a double trip arm 354 to trip the arm 77. This slide is actuated by cam 36 on drive shaft 22, which reacts against the cam follower 355 as seen in elevation in Fig. 8.

The upper jaw of the pair of jaws 8 is movable and is pivoted at 81, see Fig. 7, to the side of the case. It is provided with an upwardly projecting offset finger 82 to which is connected the tension spring 83 to bracket 84 on the frame to hold the jaw yieldingly downward into clamping position against the lower jaw which is fixed.

A cam arm 356 is carried by the slide 35 having a cam surface 357 to act under the said upper jaw 8 to release it and hold it in open position when the slide 35 is actuated by the tripping cam 36. The cam 36 is timed to open and close these holding jaws at the require intervals. The feed jaws 9 and 10 are supported on a slide 21 and are provided with suitable trip means timed to close the jaws 10 to engage the end of the web and to close the jaws 9 to engage an intermediate portion of the web adjacent to the holding jaws 7, and then feed at the end of the stroke release the sheet after the closing of the holding jaws. The main feed jaws 10 and the auxiliary feed jaw 9 are also controlled by trip devices which are readily understood by a consideration of Figs. 3, 7, 9 and 9A. The cross section arrangement of the jaws in their relation to the holding jaws appears in Figs. 3 and 8.

The upper jaw of the pair of jaws 9 is carried by the pivoted jaw carrier 91. It is actuated by cam means and a trip arm precisely comparable to those for jaws 7 and illustrated in Fig. 10. For that reason the details are not repeated. The same is provided with a trip arm 97 and roller 98 precisely comparable to the trip arm 77 and the roller 78. This arm 97 is actuated from the trip slide 37 which is supported by brackets 371, 372 and is held yieldingly in position by spring 373, as seen in Figs. 7, 9 and 9A.

Slide 37 is actuated by cam 38, see Fig. 9A, on shaft 22. Slide 37 is provided with cam follower arm 374 (see Fig. 9A). Trip 375 is provided for the arm 97 at one end of its travel and trip 376 for the other end of its travel, the slide being given a quick motion by the cam to cause the jaws to open and close promptly.

The upper of the main feed jaws 10 is pivoted at 101 and is held down by the spring 102. A projecting ear 103 is acted on by cam lever 104 which is fulcrumed at 105. This cam lever is tripped by trip arms or fingers 377 and 378 to cause the jaws to open and

close in proper timed relation to the actuation of the holder jaws. When the holding jaws 7 and 8 open, the slide 21 reciprocates to advance the sheet to the cutting position, at which point the holder jaws act and the cutters 11 and 12 sever the sheet.

The slide 21 is actuated by cam means. Main shaft 22 is provided with a cam 23 which acts upon the cam follower 24 which is fulcrumed at 25 and by link 26 is connected to lever 27 which is fulcrumed at 28 on the central bracket 19 and is connected by link 29 to a downwardly projecting lug 211 on the slide 21. It will be observed that the slide is actuated and held in position as required by the dwell of the cam and timed for the operation of the cut off shears and the throw-out mechanism.

In the example illustrated, two pairs only of cut off shears 11 and 12 are shown. In Fig. 5 shear 12 is shown for example, the shears 11 and 12 being the same. The lower shear member 121 is supported on the round longitudinal frame bar 30 at one end and is secured to the side 171 of the frame by set screw 122. The upper shear member 123 is pivoted on the stud 124 held by suitable spring 124', and is provided with lever arm 125 having a cam follower roll 126. Tension spring 127 is provided to hold the arm 125 against the cam. The shear is operated by the cam 31 keyed on the longitudinally disposed cam shaft 32. The operation and relation of the cam and means clearly appears in Fig. 5. This shear actuating cam is timed with the feed cam 23 to secure the severing of the sheet at the right time. The shear 12 cuts the web between the letterheads and the upper shear member comes down to the left hand of the lower shear blade, as seen in Fig. 1. The upper blade of shear 11 descends to the right hand of its lower blade so that the severed sheet can be discharged readily downward. The shear 11 is the same in structure as shear 12 except for the difference indicated, and it is unnecessary to describe the same in detail.

The throw-out fingers 13 and 14 are carried on the rockshaft 33 supported on the frame end 20 and are operated by the cam 34 also disposed on the cam shaft 32 the same as cam 31. The rockshaft 33 carries a rockshaft arm 331 having a cam follower roll 332, and is provided with spring 333 for holding the same against the cam 34. Cam 34 is provided with a long dwell and a notch or depression to secure quick action of the throw-out fingers timed to discharge the sheets downward at the instant they are severed by the shears. The severed sheets then drop onto the endless conveyer 15 and are discharged to the drier conveyor 16 or to any other supporting means that may be supplied.

I have described my invention as particularly adapted to the printing of embossed letterheads. I have mentioned that it could be applied to business cards and greeting cards of various descriptions, especially where multi-color work is desirable, it being possible to print as many different colors as are required by supplying additional presses, one for each color, and properly spacing the same. When small cards are being printed a plurality of strips can be delivered and printed at the same time. As this is quite obvious, it is not deemed necessary to illustrate the detail.

While my invention is especially adapted to embossed work, it can be used with any kind of printing press, using as many presses as there are colors required. If it is desired simply to have an embossed letterhead with one color, one printing press is all that is required, and in that instance two letterheads of the same kind or of different character can be embossed or printed at the same time. The possibility of a plurality of dies in the same press for different colors has already been mentioned, it being possible by dividing the ink well to deliver as many different colors as required and advance the web step by step correspondingly. Any material in web form can be printed or embossed, such as fabric, leather or sheet metal.

Where it is desirable to secure absolute precision of action I provide two pairs of holding jaws and two pairs of feed jaws. I desire to state however, that for work that does not require such precision the holding jaws 7 and the feed jaws 9 might be eliminated with a corresponding saving of mechanism.

The feed jaws, the actuating mechanism, and the cutters here detailed are all specifically described and claimed in my companion patent application, Ser. No. 331,663, filed Jan. 10, 1929, and consequently I have not indicated all of the details of the mechanism for actuating the same herein.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. An apparatus for multiple printing, comprising a plurality of presses for printing different colors disposed in spaced relation and in alinement, means for delivering a web of paper from a roll through the said presses, drier means between the said presses, a web feeding and cutting means beyond the said presses comprising two pairs of spaced holder jaws with timed means for opening and closing the same, two pairs of feed jaws one adapted to engage the end of the web and the other between the said holding jaws, means for reciprocating the said feed jaws and causing them to engage and feed the said sheet, cut off shears disposed beyond the holding jaws and timed to permit the said feed jaws to act, and throw out fingers for the sheets beyond each of the said cut off shears with connections for actuating

the same as the sheets are severed from the web, as specified.

2. An apparatus for multiple printing, comprising a plurality of presses for printing different colors disposed in spaced relation and in alinement, means for delivering a web of paper from a roll through the said presses, a web feeding and cutting means beyond the said presses comprising two pairs of spaced holder jaws with timed means for opening and closing the same, two pairs of feed jaws one adapted to engage the end of the web and the other between the said holding jaws, means for reciprocating the said feed jaws and causing them to engage and feed the said sheet, cut off shears disposed beyond the holding jaws and timed to permit the said feed jaws to act, and throw out fingers for the sheets beyond each of the said cut off shears with connections for actuating the same as the sheets are severed from the web, as specified.

3. An apparatus for multiple printing, comprising a plurality of presses for printing different colors disposed in spaced relation and in alinement, means for delivering a web of paper from a roll through the said presses, a web feeding and cutting means beyond the said presses comprising holder jaws with timed means for opening and closing the same, feed jaws adapted to engage the ends of the web, means for reciprocating the said feed jaws and causing them to engage and feed the said sheet, cut off shears disposed beyond the holding jaws and timed to permit the said feed jaws to act, and throw out fingers for the sheets beyond each of the said cut off shears with connections for actuating the same as the sheets are severed from the web, as specified.

4. An apparatus for multiple printing, comprising a plurality of presses for printing different colors disposed in spaced relation and in alinement, means for delivering a web of paper from a roll through the said presses, a web feeding and cutting means beyond the said presses comprising holder jaws with timed means for opening and closing the same, feed jaws adapted to engage the end of the web, means for reciprocating the said feed jaws and causing them to engage and feed the said sheet, and cut off shears disposed beyond the holding jaws and timed to permit the said feed jaws to act, as specified.

5. An apparatus for printing from a web comprising a printing press, means for delivering a web of paper from a roll through the same, a web feeding and cutting means beyond the said press comprising holder jaws with timed means for opening and closing the same, feed jaws adapted to engage the end of the web and advance the same, means for reciprocating said feed jaws and causing them to engage and feed the sheet, and cut off shears disposed beyond the holding jaws and timed to permit the said feed jaws to act, as specified.

6. In an apparatus for printing from a web, the combination of feed means, a plurality of cut off shears timed to operate together, and a plurality of throw out fingers corresponding to the said shears timed to act downwardly on the severed sheets as the shears finish cutting the same to insure quick discharge, as specified.

7. The method of printing letterheads in multiple colors comprising the setting of letterhead dies for each color in pairs in opposed relation, supporting the same double letterhead multiples of said letterhead lengths apart and printing the colors successively, and severing the letterheads of pairs of letterheads at the same time, one point of cutting being between the opposed prints, from the end of the web, as specified.

8. The method of printing letterheads comprising the setting of a pair of letterhead dies in opposed relation to print on a web of paper, delivering a web of paper to the said dies step by step in lengths the equivalent of two letterheads and then severing the letterheads of the two printed letterheads at the same time, one cut being between the opposed letterheads, from the end of the web, as specified.

In witness whereof I have hereunto set my hand.

ARTHUR ROSENTHAL.