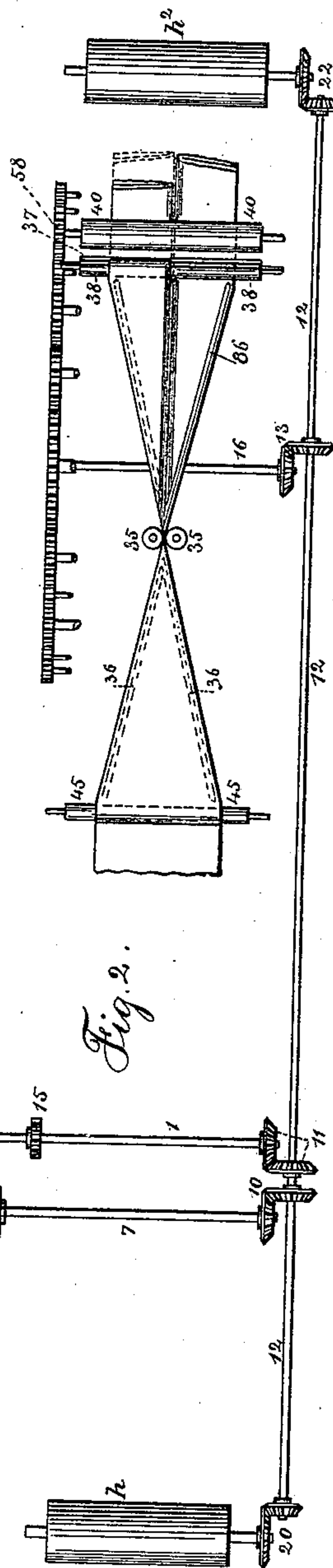
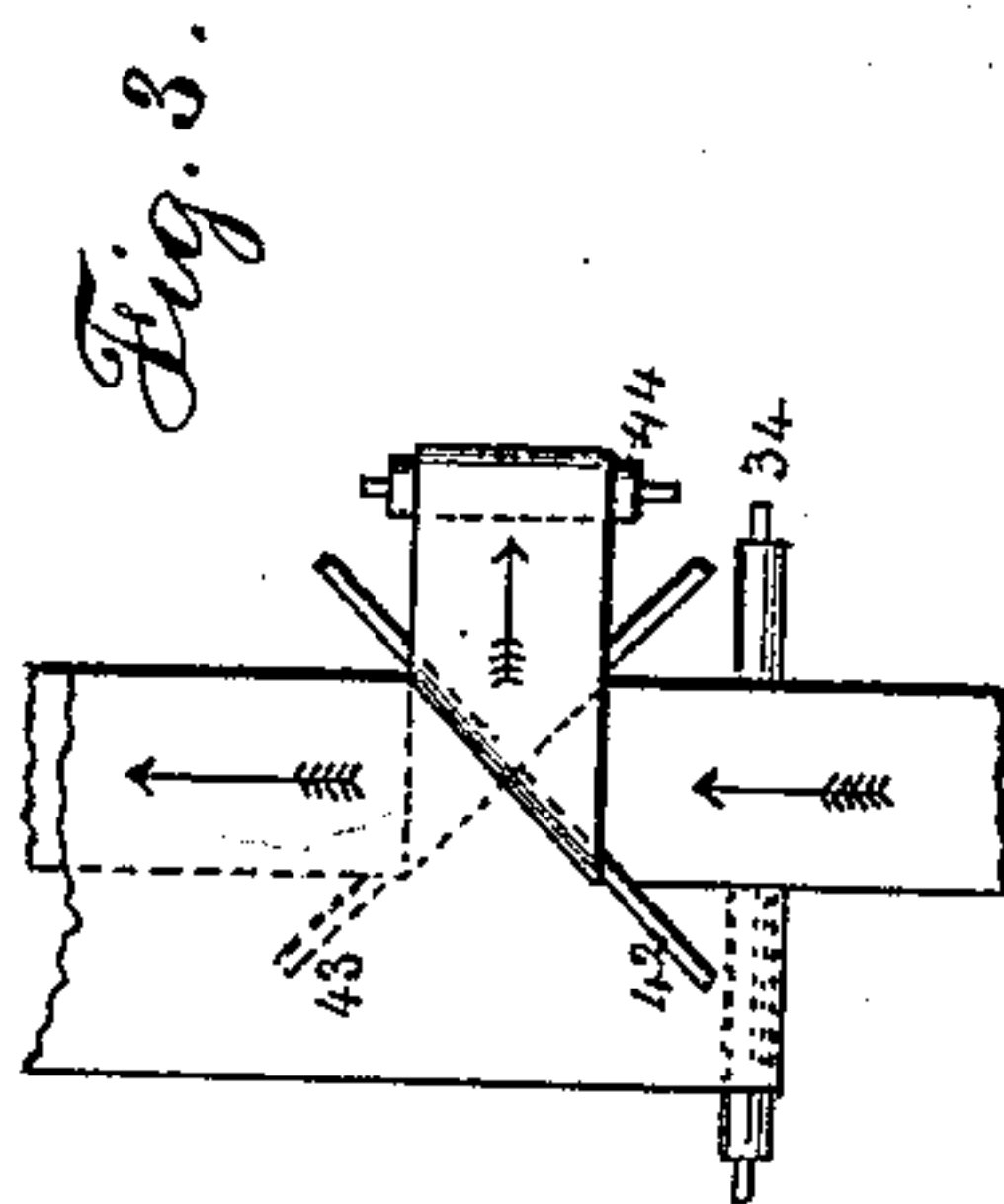
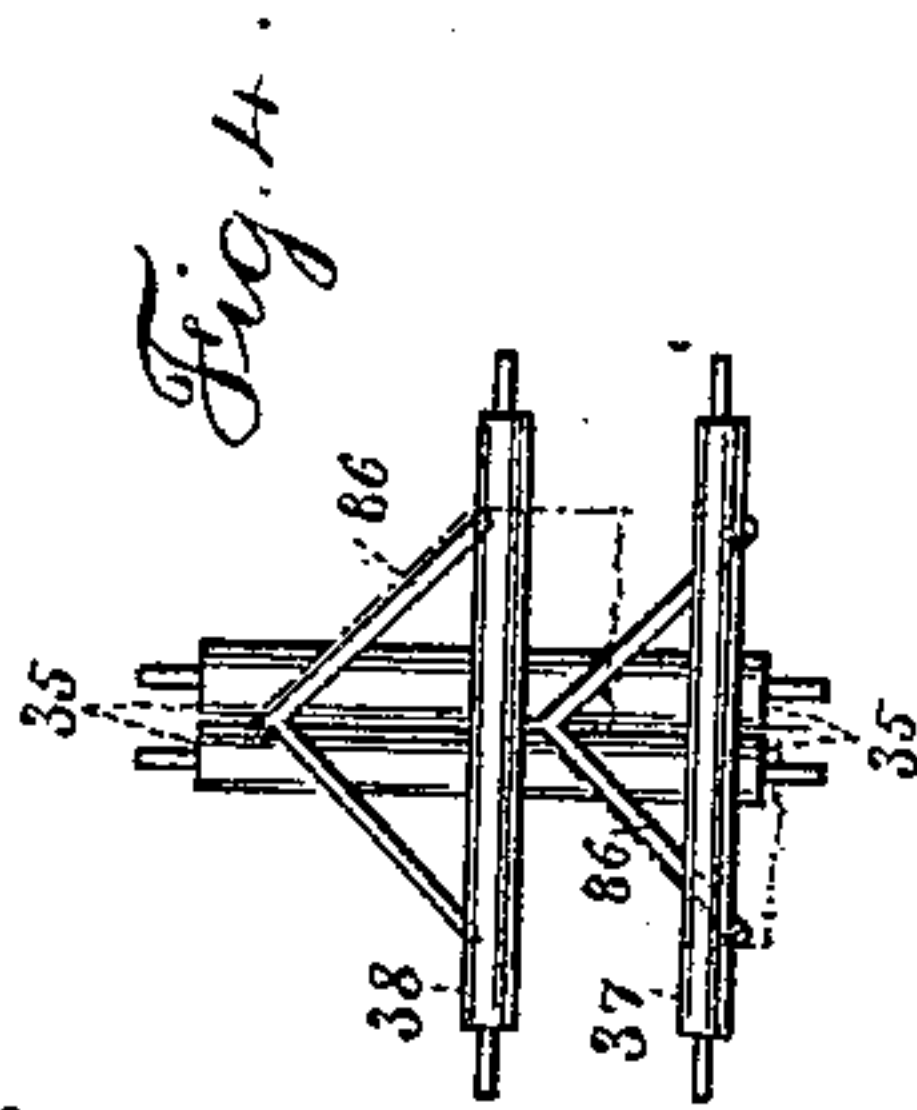
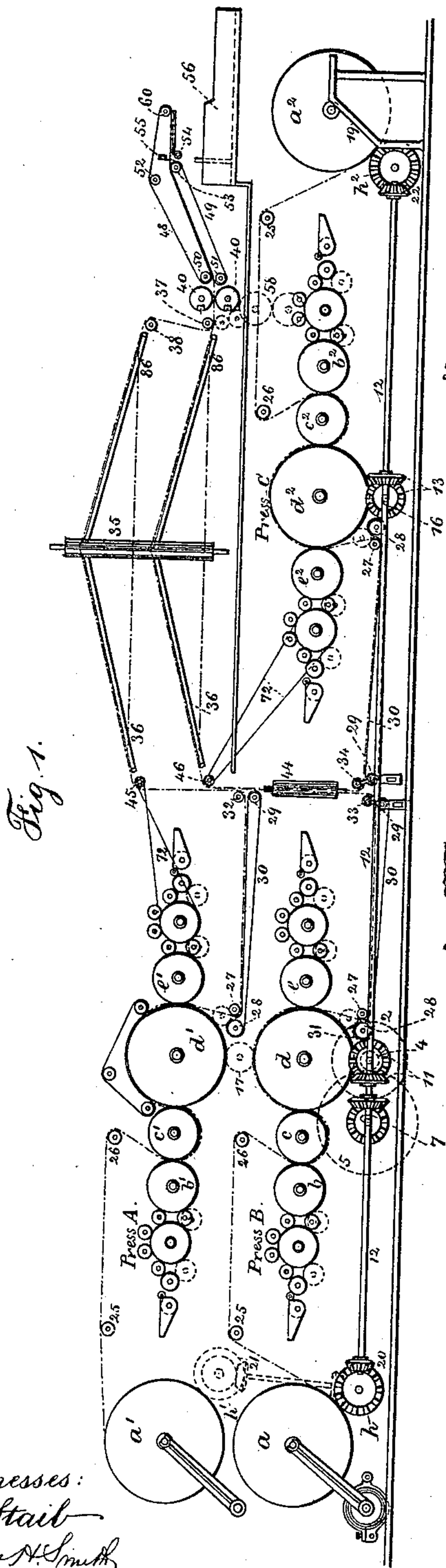


(No Model.)

W. SCOTT.  
WEB PRINTING MACHINE.

No. 436,155.

Patented Sept. 9, 1890.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

## WEB-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 436,155, dated September 9, 1890.

Application filed July 16, 1889. Serial No. 317,720. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER SCOTT, of Plainfield, in the county of Union and State of New Jersey, have invented an Improvement in Web-Printing Machines, of which the following is a specification.

My present improvements relate to the delivery and folding mechanism made use of in associating together the webs from two or more presses, folding such webs longitudinally, cutting off the associated webs transversely, and delivering the same to folding devices.

In the drawings, Figure 1 is a diagrammatic elevation of the three presses and the folding and cutting mechanism. Fig. 2 is a diagrammatic plan view representing the gearing employed in driving the presses. In these views the frame-work of the machine is left off for greater clearness. Fig. 3 is a diagrammatic view representing the manner in which the web is turned to transpose the positions of the pages. Fig. 4 is an elevation of the folding bars and rollers made use of in bringing the webs into their proper positions to fold and cut the same.

I have represented three presses, designated as presses A B C, the press A being above the press B and the press C in the same plane as the press B and at one end thereof, and the presses are so placed that the roll of paper  $a'$  for the press A is above the roll of paper  $a$  for the press B, and the roll of paper  $a^2$  for the press C is at the distant end from the press B, so that the webs of paper from the presses B and C come toward each other and are delivered upwardly and centrally, as hereinafter set forth.

I have represented type-cylinders  $b$   $b'$   $b^2$  for the respective presses, first-impression cylinders  $c$   $c'$   $c^2$ , second-impression cylinders  $d$   $d'$   $d^2$ , and second type-cylinders  $e$   $e'$   $e^2$ , and I remark that the inking devices for the respective type-cylinders are to be of any desired character—such, for instance, as those illustrated in the drawings, Fig. 1.

The driving-shaft 1 is provided with a fast pulley 2 and a loose pulley 3, and connected with this loose pulley 3 is a pinion 4, gearing to a wheel 5 upon a shaft 6. Hence when the press is stopped by shifting the belt upon the

loose pulley 3 the pinion 4, gear-wheel 5, and short shaft 6 will be continuously rotated.

In line with the shaft 6 is a secondary shaft 7, and there is a friction-clutch 8 between the shafts 6 and 7, which friction-clutch is operated by a suitable lever, so that power can be applied from the shaft 6 through the friction-clutch to rotate the shaft 7 at a greater or less speed, according to the force applied to the friction-clutch. This shaft 7 is made use of for moving the whole of the presses at a slow speed whenever it is desired to enter the end of a fresh web of paper or to make any tests in the printing of the web or the adjustments to bring the sheets to the proper register, and after this has been done the belt is to be lifted from the loose pulley 3 to the fast pulley 2 and the power applied directly to the driving-shaft of the printing-presses.

In order to connect the respective presses B and C, I make use of a longitudinal shaft 12, connected by the bevel-gears 11 and 10, respectively, with the shafts 1 and 7 and by the bevel-gears 13 with the driving-shaft 16 of the press C, and I connect the gear-wheels upon the shafts of the second-impression cylinders  $d$   $d'$  by the gear-wheel 17, (shown by dotted lines in Fig. 1,) so that the presses A B C will move together, whether receiving a fast or slow motion through the gearing-shafts, and friction-clutch before described, and I remark that when the belt is upon the fast pulley 2 the friction-clutch 8 is to be liberated, because the shaft 7 will be revolved by the shaft 1 and bevel-gears 10 and 11, and it is preferable for the shaft 6, gears 4 and 5, and loose pulley 3 to remain stationary while the press is run in its normal condition.

The rolls of paper  $a$   $a'$   $a^2$  are upon axes or shafts, as usual, and such axes may be supported upon crank-arms, (shown in connection with the presses A and B and similar to the devices set forth in my Patent No. 404,505,) or the shaft of either one or more of the rolls of paper may rest upon inclined planes 19, as shown in connection with the press C. In either instance the weight of the roll of paper rests to a considerable extent upon its driving-roll, and these driving-rolls are represented at  $h$   $h'$   $h^2$ , Figs. 1 and 2, and they are



to be driven at the proper speed by suitable gearing—such as the bevel-gears 20 21 22—for rendering the supply of paper uniform to each press and for lessening the tension upon the webs of paper, and I remark that in order to prevent the paper being supplied too fast it is advantageous to make one of the bevel-gears slightly smaller than the other, as represented in Figs. 1 and 2, in order that there may be a slight tension on the paper as the paper slips in contact with its feed-roll  $h$ ,  $h'$ , or  $h^2$ .

Tapes or belts may be made use of in carrying the webs of paper into and through the printing-machines, or these may be dispensed with.

I have shown guide-rolls 25 26 for the webs of paper to pass over in reaching the first-impression cylinders, and rolls 27 for the paper to pass around as the webs leave the second-impression cylinders of each press, and I have shown rolls 28 29 and ranges of belts 30 for conveying the webs to the places where they are brought together, and I remark that when either one or more of the webs is to be split longitudinally it is preferable to apply a rotary cutter or slitter 31 to the roll 28 at the proper place for cutting up such web either in the center or at more than one place widthwise of the web.

The foregoing devices are described in order that the peculiar features of my delivery mechanism as connected with such presses may be more clearly understood; but these parts, forming the subject of a separate application of like date herewith, are not herein claimed.

The printed web from the press A passes beneath the roll 32 and up over the roll 45 or 46, and the printed web from the press B passes beneath the roll 33 and up to either the roll 45 or 46, and the printed web from the press C passes beneath the roll 34 and up over either the roll 45 or 46, and is folded as next described.

The pair of vertical rolls 35 are midway of the converging folders 36 and turners or inclines 36. These turning or folding inclines are composed of bars, as heretofore usual, for the paper to pass over at each side of the pair of vertical rolls 35. These inclines are shown endwise in Fig. 4, and they are similar, and there are rollers 37 38 at the distant ends of these inclines 36, and at 40 cutting-cylinders are represented, one cylinder having a projecting cutter, as usual in cutting and folding apparatus, and at 48 49 are belts passing around the respective rolls 50 51 52 53 60 for conveying the sheet to the folding-blade 55, which folding-blade receives a movement at the proper time, as usual in folding-machines, and the folded product is passed down between the rollers 53 54 either into the receptacle 56 or upon belts to receive another fold, as usual in folding-machines, and at 58, I have represented a train of gearing for giving mo-

tion to the cutting-cylinders 40, such train of gearing receiving motion from the gears that connect the respective cylinders in the press C.

It is now to be understood that the three webs from the presses A B C can be brought together and passed over either the roller 45 or the roller 46, the web from the press B being between the webs from the presses A and C, and the three webs can be folded upon the inclines 36 and passed between the rolls 35 and be delivered below the roll 37 to the cutters 40, and, if desired, the web from the press B can be split longitudinally, one-half of such web going with the web from the press A up over the roller 45, the half-web from B being below the whole web from A, and the folded product will pass over the roller 38, and the web from the press C and the half-web from the press B can pass over the roll 46 and be delivered below the roll 37 to the cutters 40, and it will be apparent by reference to Fig. 2 that the folded web, coming over the roll 45 and folder 36 and between the rolls 35 and over the roller 38, can be turned off in one direction after passing the rolls 35, and the web from the press C, passing over the roll 46 and lower folder 36 and below the roll 37, can be turned off in the opposite direction after passing the rolls 35, so that the folded edges of the webs will be adjacent to each other as they pass through between the cutting-cylinders 40, and pass on to the folder 55 as separate products, or the webs can be turned in the same direction after passing the rolls 35, so that the web passing over the roller 38 from the press A will come directly over the web from the press C as the two pass beneath the roll 37. The bars 86 between the rolls 35 and 37 38 only act as turners to direct the folded sheet.

I remark that in order to bring the half-web from the press B into its proper position in relation to the whole web from the press C, it is generally preferable to turn the half-web by the bars 42 and 43 and the roller 44, so that the half-web from the press B can be turned over the inclined bar 42, around the roll 44, and brought back under the inclined bar 43 and delivered against the web from the press C as it passes upwardly and over the roll 46, so that such half-sheet may be between the whole sheet and the roll 46 and be folded inside the web from the press C in the same manner as the other half-web passes up with the web from the press A and over the roller 45, the web from the press C passing under the roller 34 and up between the bars 42 and 43, as illustrated in Fig. 3.

By the foregoing description it will be apparent that the three presses, arranged and connected together in the manner before described, and the folding and cutting apparatus that receives the webs from the respective presses can be used in a variety of ways, according to the character of newspaper or signature to be printed. Either press can be run separately and the single web printed



on the same, delivered, folded, and cut. Either two of the presses can be run together or all three of them, and the product from either two or the three presses can be brought together and folded and delivered either as a single product or as two products. This is a great convenience in the printing, associating, folding, cutting, and delivering of daily newspapers in which four, six, eight, ten, twelve, or sixteen pages are required to be brought together. Four pages can be printed on either press, or two pages on one press and two on another, and eight or sixteen pages can be printed on two presses, four or eight pages being printed on each press. Six pages can be printed by a whole and half web from two presses, and ten pages by two whole and one half webs from three presses, and twelve pages by a whole web, with four pages from each press, and so on. The presses occupy comparatively small space, the folding and cutting device being above the press C. I, however, remark that in some places it may be more convenient to locate the folding and cutting device below the press C, in which case the press C will be parallel and in the same plane with the press A, and the webs of paper will be carried downwardly instead of upwardly. I also remark that it is not necessary to carry the folded web that passes off the roll 38 beneath the roll 37, as the paper might pass directly from the roll 38 around and between the cutting-cylinders 40.

The rolls 32 33 34 may be adjustable in position to aid in bringing the respective webs properly into register one with the other, or the adjustment may be made by loosening the gears upon the shafts of either of the type-cylinders and turning the respective parts until the webs are brought to register properly one with the other, or any ordinary or desired adjusting devices may be employed.

Where two webs of paper have been passed longitudinally over folding-inclines the under sheet is exposed to friction on the folder, and the mechanism for drawing the webs along usually acts on the upper and outer web. Hence there is a risk of the printed matter not remaining properly in register. I rectify this difficulty by giving to the roll 45 or 46, or both, a surface speed greater than that of the web of paper passing over it, and as the under web always comes into contact with such roll there is a tension applied to the paper and the under web is kept tight and passed upon the folding-inclines with the proper register, and the detrimental effects of friction on the folder are avoided. If the two webs are not brought properly to register before they pass to the folding-inclines, the error cannot be rectified after being folded. Hence it is necessary that the device for applying a tension to the inner web by a greater surface-speed be located at the end where the two webs pass upon the folding-inclines.

I have shown belts at 72 for driving the rolls 45 46 at a surface-speed greater than

that of the paper, and these rollers act to keep the under web tight and pass the paper to the entering ends of the folding-inclines.

This arrangement of presses can be run in other ways than those before mentioned. For instance, a single web of double width may be printed on either the press A or the press C, and be slit longitudinally by a cutter similar to that at 31, and then by the bars 42 43 and roller 44 one half of the web can be turned off and brought back beneath the other half-web, and then the two half-webs will be folded longitudinally as they pass along the folding-inclines 36 and between the rollers 35, after which the product is cut off in sheets.

I claim as my invention—

1. The combination, with the printing-presses and the rolls for bringing together the printed webs from the respective presses, of the folding-inclines 36 and turning-inclines 86, one above the other, the rolls 35 between the folding and turning portions of the inclines for acting upon the folded webs, the rolls 38 and 37 at the delivery ends of the inclines for the respective folded webs, and the cutters 40, for separating both folded webs, substantially as set forth.

2. The printing-presses A B C, the press A being over the press B and the press C being in the same plane as the press A or B, in combination with the rolls 32 33 34, around which the respective webs pass, the converging folders 36, the rolls 35, between which the folded webs pass, the rolls 37 and 38, the turners 86, the cutters 40, for separating the webs transversely, and the folding-blade 55, substantially as set forth.

3. The combination, with the printing-presses A B C and the rolls 32 33 34, around which the respective webs pass as they are brought together, of the cutter for slitting the center web longitudinally, the rolls 45 and 46, over which the whole and half products from the respective presses pass, the converging folders 36 and rolls 35, for folding the respective products, the turners 86, the cutters 40, for separating the folded products, and the rolls 37 and 38, for guiding the folded webs, either separately or together, to the cutters, substantially as set forth.

4. The presses A B C, arranged substantially as set forth, the rollers 32 33 34, for the printed webs from the respective presses, the bars 42 43 and roller 44, for inverting the web from one of the presses, and the rolls 45, 46, and 35, and folding-inclines 36 and turning-inclines 86 at the sides of the rolls 35 for the folded webs, and the cutters 40, for receiving and cutting the folded webs either jointly or separately, substantially as set forth.

5. The combination, with the two web-printing presses, of two folders for folding the paper longitudinally, a pair of rolls 35, for acting upon the two folded webs, turners for turning the folded web in either one direction or the other, and cutters to which the



webs are presented to form one product or two separate products, substantially as set forth.

6. The combination, with a longitudinal folding-incline and means for supplying to such folding-incline two printed webs of paper, one over the other, of a roller adjacent to the entrance end of the folding-incline, and over which the webs pass, and means for giving to such roller a surface-speed greater than that of either web for applying to the inner web that is in contact with such roller a greater tension than to the outer web before passing to the folding-incline to insure proper

register of the two webs previous to and during the folding, substantially as specified. 15

7. The combination, with three web-printing presses, of a splitter to divide one web longitudinally and a turner acting upon one-half of the split web to present the same in its proper position to one of the whole webs, the other half-web passing straight to the other whole web, substantially as specified. 20

Signed by me this 12th day of July, 1889.

WALTER SCOTT.

Witnesses:

GEO. T. PINCKNEY,  
WILLIAM G. MOTT.