

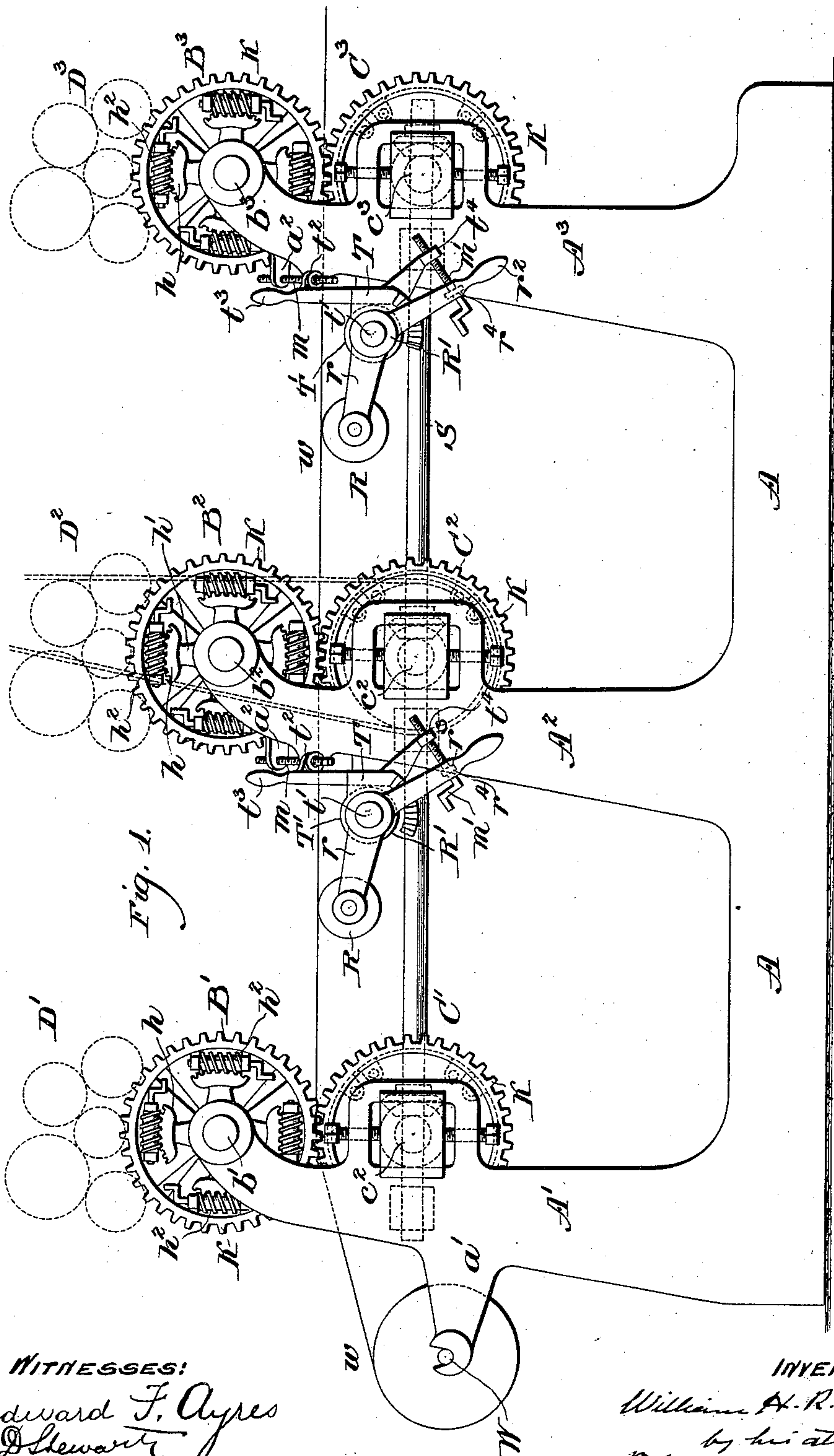
(No Model.)

2 Sheets—Sheet 1.

W. H. R. TOYE.  
WEB PRINTING PRESS.

No. 534,300

Patented Feb. 19, 1895.



WITNESSES:  
Edward F. Ayres  
Stewart

INVENTOR:  
William H. R. Toye  
by his atty.  
Francis T. Chambers

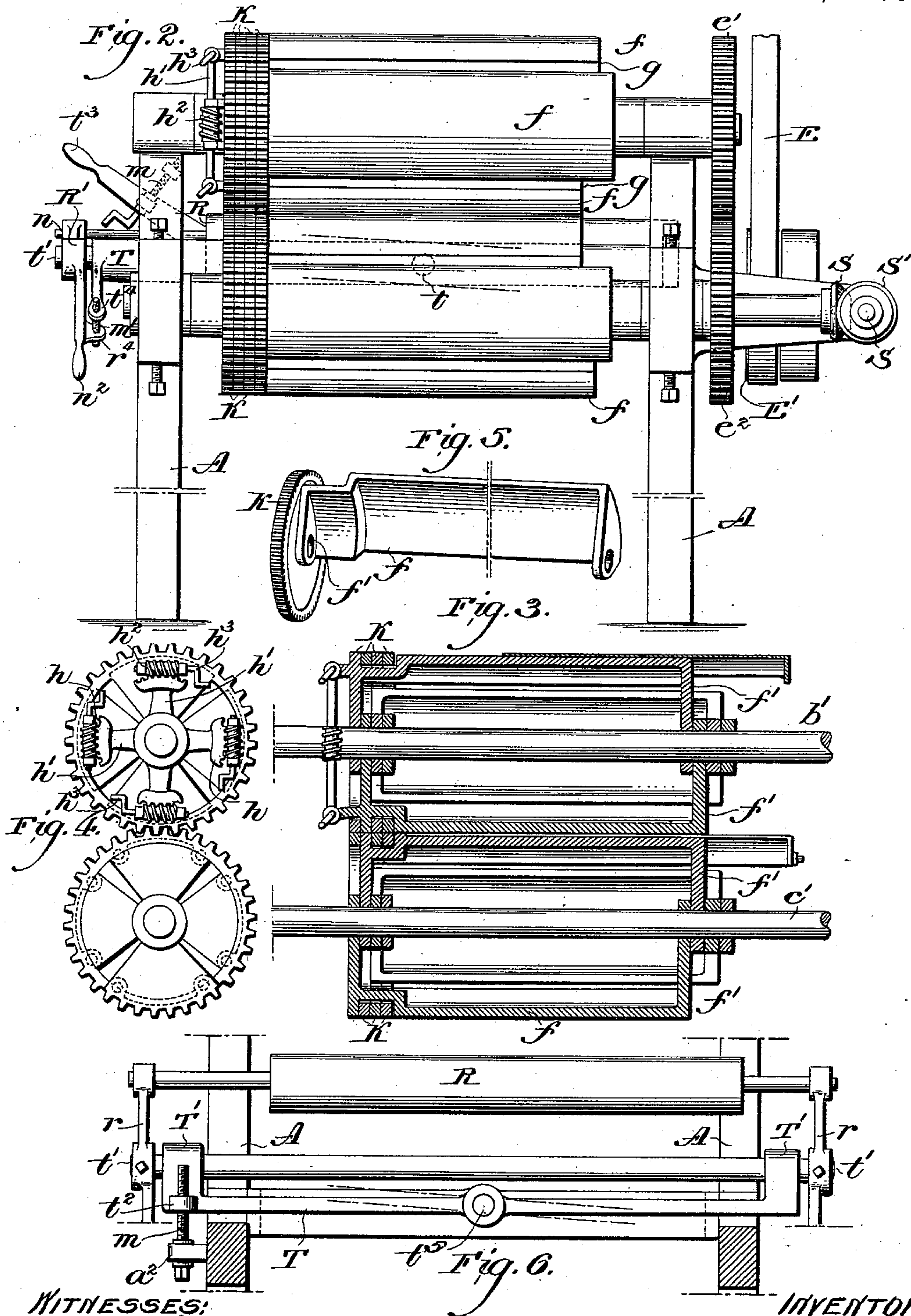
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2 Sheets—Sheet 2.

W. H. R. TOYE.  
WEB PRINTING PRESS.

No. 534,300.

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WITNESSES:  
Edward F. Ayres  
Shaw & Co.

INVENTOR:  
William H. R. Toye  
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Francis T. Chambers



# UNITED STATES PATENT OFFICE.

WILLIAM H. R. TOYE, OF PHILADELPHIA, PENNSYLVANIA.

## WEB-PRINTING PRESS.

SPECIFICATION forming part of Letters Patent No. 534,300, dated February 19, 1895.

Original application filed June 17, 1893, Serial No. 477,919. Divided and this application filed November 6, 1893. Serial No. 490,108. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. R. TOYE, a citizen of the United States, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Web-Printing Presses, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to printing presses and has for one object to so guide a web of paper, cloth or other material that it will always travel in a predetermined path relatively to the printing rolls, and also to provide a web printing press capable of the most delicate adjustment of one set of types relatively to any other. To this end I direct the web of paper, cloth or other material, by carrying it over a suitable support or supports and turning these supports at an angle to a line which lies in the normal plane of the web, and at right angles to the line of travel of the web. I have discovered that by this means a moving web of paper can be directed so that it can be made to take any desired path between printing rolls or any other device for acting on a roll of paper. I also form the cylinders which constitute the printing rolls of a number of segmental sections and arrange these so that they can be adjusted circumferentially to take up for any inequality in the action of the separate sections.

My invention is best described in connection with the accompanying drawings which illustrate my improved press provided with an apparatus for directing the paper according to the method described, and in which drawings—

Figure 1 is a side elevation of a press provided with my improvements. Fig. 2 is an end elevation looking from the right end of Fig. 1. Fig. 3 is a vertical section of one of the sets of printing cylinders showing the mode of supporting the segmental sections of which they are composed. Fig. 4 is an end view of the cylinders shown in Fig. 3 showing the gears. Fig. 5 is a perspective view of one of the segmental sections removed, and Fig. 6 is a top view of one of the web supporting

devices showing the preferred mode of turning it to direct the web of paper.

A is a suitable frame having upright arms  $A' A^2$ , &c., on which are supported the printing couples  $B' C'$ ,  $B^2 C^2$ , &c., any number of which are provided as may be necessary, the particular style of press shown being one adapted to print on a web of paper, cloth or other material which passes through the press in a long strip as distinguished from separate sheets. Such a web is shown at  $w$  being supported in a roll at  $W$  on arms  $a'$  of the frame.

$D' D^2$ , &c., are suitable inking rolls for the type cylinders  $B' B^2$ , &c.

The different printing couples being specially adapted to impress different colors on the web of paper or other material carried through them, it is very important that, first, the web should always be fed to each cylinder in an exactly predetermined path, that is, it should not arrive at one set of printing cylinders in the least degree to one side of the position it had when passing between the previous set, any deviation in this respect not only spoiling the general register but also affecting the side margins, and, secondly, the stretch of the paper or other material due to dampening as it passes between the printing rolls or to the action of a roll where there are heavy surfaces operating should be taken up so that a particular point on the paper will not reach one set of printing rolls in advance of the position it had relatively to the previous set. To effect the exact directing of the web I pass it over a suitable support suitably pivoted to the frame of the press and turn this support at an angle to a line in the normal path of the web and at a right angle to the line of travel thereof, and to take up the slack I stretch the web between the rolls. The devices by which these adjustments are made are best shown in Figs. 1, 2 and 6, where  $R$  is a suitable support, preferably a roller which is pivoted on arms  $r$  as shown. These arms  $r$  are part of a frame  $R'$  which is journaled at  $t'$  in bearings  $T'$  of a frame  $T$  so that the frame  $R'$  can turn and thus raise and lower the support  $R$ . The frame  $T$  is itself pivoted to the frame of the press so that it can be turned to tilt the frame  $R'$  and consequently the supporting roller  $R$ .



In Fig. 2 I have shown the frame T as pivoted at  $t$  to the frame so that it can be tilted in a vertical plane at right angles to the plane of the web, but I prefer to pivot the frame to a vertical stud, as indicated at  $t^5$  in Fig. 6, and turn it in a horizontal plane, or rather in the plane of travel of the web. This effects the lateral adjustment of the web and does not lift the web in any degree from its normal plane of travel.

A very slight tilt in one way or the other will be sufficient to direct the moving web so that the operator can govern its motion very exactly. If the paper stretches the supporting roller R can be raised either in its normal or tilted position, by turning the frame R' in its bearings T' as described and thus the slack can be taken up which would otherwise render the paper untrue and spoil the register.

If the paper or other web is traveling correctly, it is, of course, unnecessary to employ guides, and I therefore prefer to arrange the supporting and guiding roller R so that it will normally lie out of the path of the web, but can be brought into such path to correct any false running of the web.

To conveniently move the frame T and hold it in any desired position I provide lugs  $a^2$  and  $t^2$  on the main frame of the press and the frame T respectively. One of these lugs is tapped, and in the other a screw rod  $m$ , which connects the two lugs, is adapted to turn freely, so that by turning the screw the frame T can be turned on its pivots  $t$  or  $t^5$  and held in the desired position. Similar lugs  $t^4$  and  $r^4$  on the frame R' and T serve to engage with a screw  $m'$  whereby the frame R' can be turned in its bearings T'. Any other suitable device such as wedges or cams can obviously be substituted for the screw and lugs.

In order to render the adjustment most complete and so that the inequality of action of any one of the type sections on the printing cylinder with respect to any other may be overcome, I make up the cylinders of segmental sections  $f$  which are pivotally supported on the shafts  $b' c'$ , &c., of the cylinders by means of arms  $f'$ , and which are preferably of such a size that there will be a space  $g$  between each section and its neighbor, and I provide means to move each section circumferentially. In the construction shown a number of screw racks  $h$  preferably of segmental form are secured by means of arms  $h'$  to the shaft  $b'$  or  $c'$  which supports the sections. An endless screw  $h^2$  whose thread meshes with the thread on the rack is secured to each section and by turning the screw as by suitable cranks  $h^3$  any one of the sections can be adjusted circumferentially with respect to the others. In order to move the corresponding section on the coacting cylinder of the printing couple without the trouble or risk of error which would ensue if the type and platen surfaces were adjusted separately, I connect the two corresponding sections so that they will move together. A convenient mode of doing this

is shown in the drawings where a gear wheel K is secured to each section  $f$  of one cylinder which gear wheel engages with a similar gear K secured to a corresponding section  $f$  on the other cylinder of the printing couple, and thus by adjusting one section on the cylinder B', which is shown as a type or platen cylinder, the corresponding platen section C' will be adjusted to correspond, and by this adjustment the most exact register of the different parts may be obtained, and any inequality of the action of the various plates or types completely taken up.

The press may be driven by any suitable gears. I have shown a belt E adapted to drive a pulley E' which is connected to and drives a shaft S. Bevel gears  $s, s'$  serve to transmit motion to the shafts  $c' c^2$ , &c. On these shafts are gear wheels  $e$  which gear with similar gears  $e'$  on the shafts  $b'$ , and so serve to drive the upper cylinders B' B<sup>2</sup>, &c.

This press is adapted to carry out my method of multi-tinting described in the application, Serial No. 477,919, filed by me on June 17, 1893, and of which application this case is a division.

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

1. In a web printing press having a set or sets of printing rolls, between which the web passes, a device for guiding the web laterally consisting of a single roll adapted to lie normally out of the path of the web, and arranged on that side of the web which does not carry a freshly imprinted ink, means for raising the roll into the path of the web, and means for turning the roll in the plane of the web, from a line at right angles to the line of travel thereof.

2. In a web printing press, having a set or sets of printing rolls between which the web passes, a device for guiding the web laterally consisting of a single roll adapted to lie normally out of the path of the web, and arranged on that side of the web which does not carry a freshly imprinted ink, means for raising the roll into the path of the web to such a distance that the path of travel of the web will be materially lengthened, and means for turning the roll in the plane of the web from a line at right angles to the line of travel thereof.

3. In a web printing press the combination with a printing couple, of a roller R adapted to support the web behind the printing couple, a frame T pivoted so as to swing out of a line parallel to the normal plane of the web and at right angles to the line of travel thereof and adapted to support the roller R and means for swinging the frame T on its pivot substantially for the purpose specified.

4. In a web printing press the combination with a printing couple, of a roller R adapted to support the web behind the printing couple, a frame T pivoted on the frame of the press so as to swing out of a line parallel to the normal plane of the web and at right an-



gles to the line of travel thereof and adapted to support the roller R and means for swinging the frame T on its pivot substantially for the purpose specified.

5 5. In a web printing press the combination with a printing couple, of a roller R adapted to support the web behind the printing couple, a frame R' in which said roller R is journaled, a second frame T to which the frame  
10 R' is pivoted, a pivot for securing the frame T to the press and means for swinging the frames on their pivots substantially for the purpose specified.

15 6. In a web printing press the combination with two printing couples, of a roller R adapted to support the web between the printing couples, a frame R' in which the roller R is journaled, a second frame T to which the frame R' is pivoted, a pivot for securing the  
20 frame T to the press and means for swinging both frames substantially for the purpose specified.

25 7. In a web printing press the combination with two printing couples, of a roller R adapted to support the web between the printing couples, a frame R' in which the roller R is

journaled, a second frame T to which the frame R is pivoted, a pivot for securing the frame T to the press, a screw *m* for tilting the frame T and holding it in any desired position and a screw *m'* for tilting and holding the frame R'. 30

8. In a press, a printing couple consisting of two cylinders, each composed of a number of independent segmental sections *ff*, means  
35 for adjusting the sections of one of the cylinders circumferentially and connection whereby corresponding sections of the second cylinder will be moved with the sections of the first cylinder. 40

9. In a press, a printing couple consisting of two cylinders, each composed of a number of independent segmental sections *ff* having gears K K connected thereto, the gears of corresponding sections being intermeshed and  
45 means for adjusting the sections on one cylinder circumferentially.

WILLIAM H. R. TOYE.

Witnesses:

ALF. H. FABER,  
D. STEWART.