

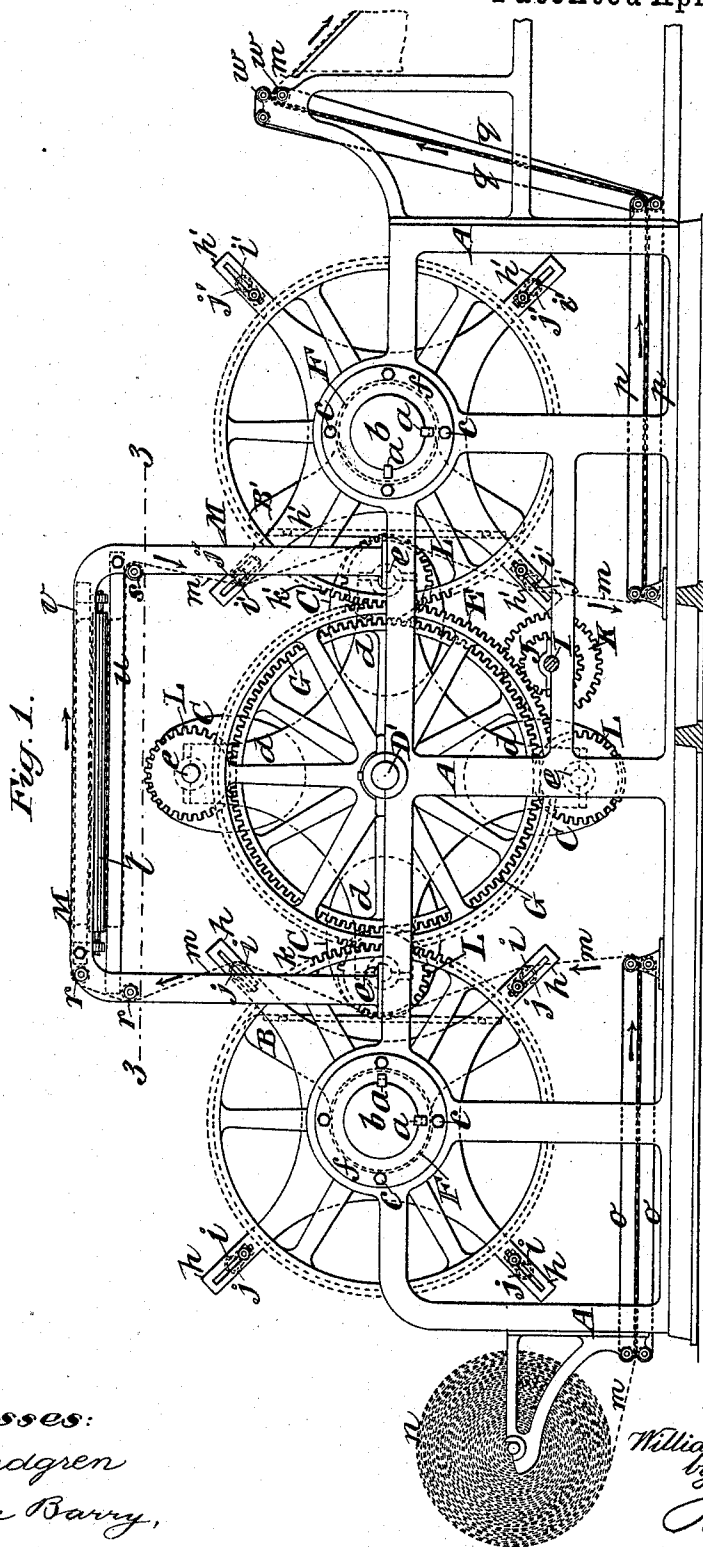
(No Model.)

4 Sheets—Sheet 1.

W. H. BLAKENEY.
PRINTING MACHINE.

No. 537,669.

Patented Apr. 16, 1895.



Witnesses:
O. Sundgren
George Barry,

Inventor:
William H. Blakeney
by attorneys
F. W. Howard

(No Model.)

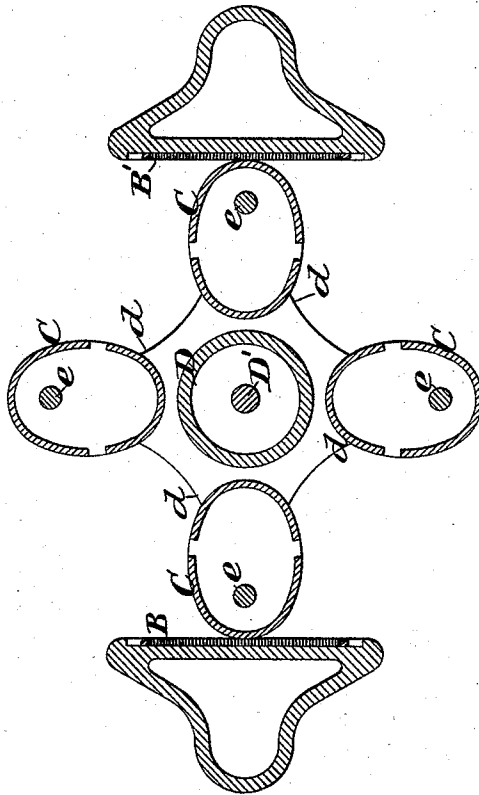
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Fig. 2.



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F. W. & Seward

(No Model.)

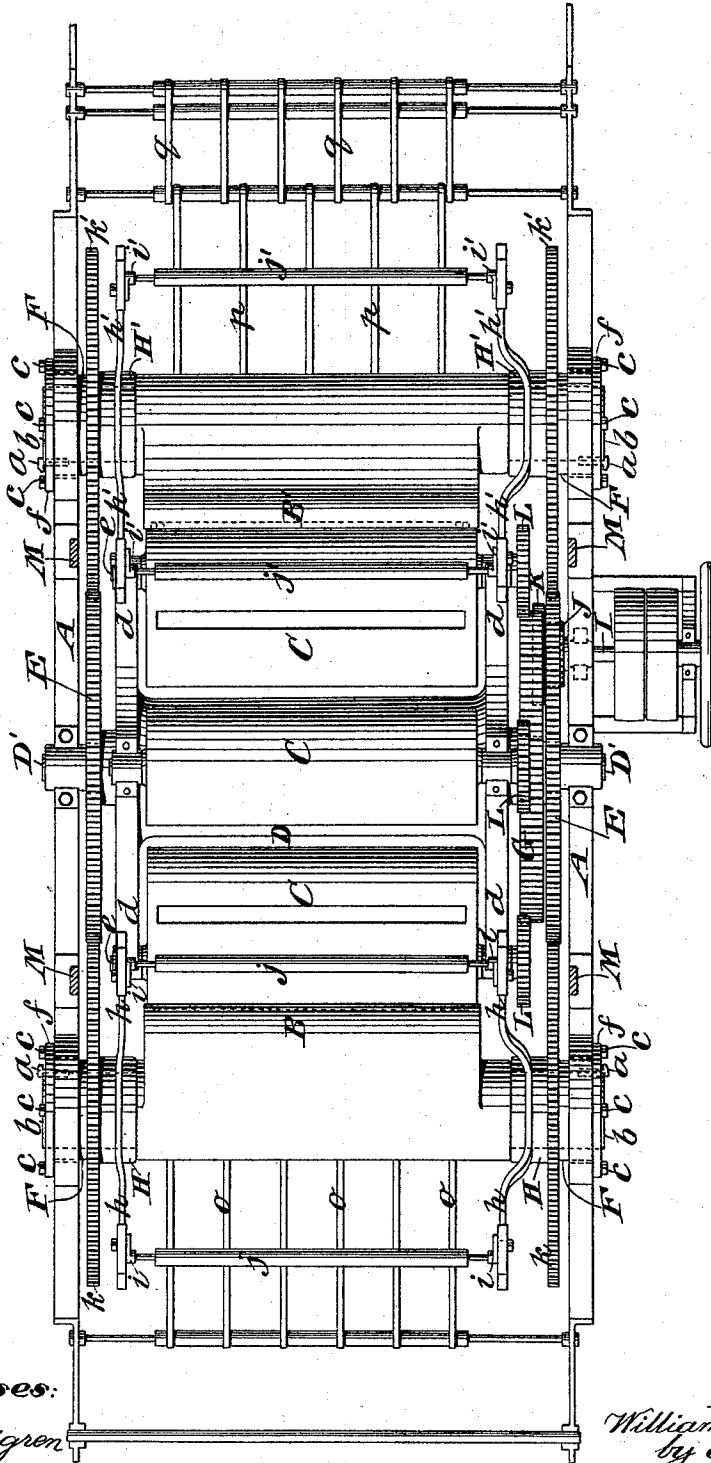
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Fig. 3.



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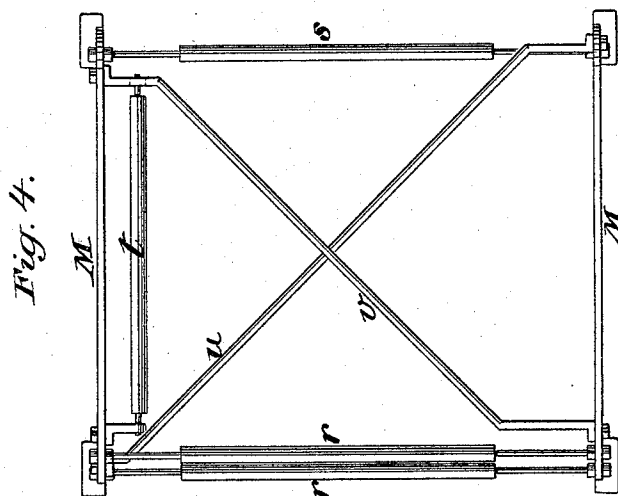
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PRINTING MACHINE.

No. 537,669.

Patented Apr. 16, 1895.



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Inventor:
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Horn & Howard

UNITED STATES PATENT OFFICE.

WILLIAM H. BLAKENEY, OF DUNDEE, SCOTLAND, ASSIGNOR TO THE C. B. COTTRELL & SONS COMPANY, OF STONINGTON, CONNECTICUT.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 537,669, dated April 16, 1895.

Application filed December 7, 1894. Serial No. 531,120½. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BLAKENEY, of Edengrove, Dundee, in the county of Forfar, Scotland, have invented a new and useful Improvement in Printing-Machines, of which the following is a specification.

This invention relates to what are known as "perfecting" printing machines.

In a machine embodying my invention two stationary form beds face each other and between them there is arranged a series of impression cylinders which have a planetary motion about an axis midway between the said beds.

The improvement consists in certain combinations hereinafter described and claimed in which such form beds and cylinders form elements.

I will proceed to describe my invention with reference to the accompanying drawings, and afterward point out its novelty in claims.

Figure 1 represents a side elevation of such parts of a printing machine as are necessary to illustrate my invention; Fig. 2, a vertical section parallel with Fig. 1, of the form beds and impression cylinders and the rotary carrier by which the latter are successively brought into operative relation with the form beds; Fig. 3, a plan view from which the representation of all the parts above the line 3, 3, of Fig. 1, are omitted; Fig. 4, a plan view of the parts above the line 3, 3, of Fig. 1, which are omitted from Fig. 3.

Similar letters of reference designate corresponding parts in all the figures.

A A are two parallel side frames constituting the principal portions of the framing of the machine.

B B' are two stationary form beds facing each other vertically. These form beds are represented as supported in the side frames A by gudgeons *b* provided on the ends of each, the said gudgeons being firmly and fixedly secured by keys *a* into stationary bearings F *f* provided for them in the side frames, the said bearings being represented as consisting of cylindrical hubs F having flanges *f* through which they are bolted to the side frames A by bolts *c c*.

C C are impression cylinders of which four are represented. These cylinders are eccen-

tric to their shafts *e* and are of approximately elliptical peripheral contour and have their shafts *e* journaled in, and at equal distances from the center of, a rotary carrier D *d* which is firmly secured to a shaft D' which is supported in bearings on the side frames A exactly midway between the stationary form beds B B'. The said carrier consists of a cylinder or barrel D having at its ends arms *d d* which contain the bearings for the shafts or journals *e* of the cylinders C C. The carrier shaft D' has firmly secured upon it two large spur gears E, one at each end of the carrier, and the said shaft also has fitted to it to turn freely upon it, a smaller spur gear G.

I is the driving shaft of the machine carrying two spur gears J K. The smaller one J of these gears on the driving shaft gears with one of the gears E on the said shaft D' for the purpose of giving rotary motion to the carrier D *d* and the larger one K of said gears on the driving shaft gears within the loose gear G on the shaft D' for the purpose of giving rotary motion to the several cylinders about their own axes; the said gear G gearing with spur gears L, one fast on each cylinder, for the purpose of producing the last mentioned rotary motion. It will be understood that by means of these gears J E and K G L, the impression cylinders C C are caused to have a planetary motion about the axis of the carrier shaft D'. The circumferences of the said cylinders C C are delineated with such varying radii that as the said cylinders in their planetary motion pass either of the form beds, their peripheral surfaces will run parallel with the said beds or in printing relation thereto.

On each of the fixed gudgeons *b* of the form bed B which carries the first form, is one of two loose hubs H which carries a spider represented as comprising four equidistant radial arms *h*. The said two hubs and attached spider constitute a rotary roller carrier in which are contained the bearings *i* in which are journaled four rollers *j*, the number of said rollers corresponding with the number of impression cylinders. The roller bearings *i* are adjustable radially within the arms *h* to set said rollers *j* at different distances from the center of the carrier H *h*. To the hubs H

there are secured spur gears k which gear with and derive motion from the two spur gears E fast on the cylinder carrier for the purpose of producing the rotation of said roller carrier Hh and producing a revolution of the rollers j about the gudgeons b of the form bed B . On the gudgeons b' of the form bed B' which carries the second form there is a roller carrier $H'h'$ similar to that Hh just described, the said carrier $H'h'$ carrying the adjustable bearings i' for rollers j' which are similar to j . The said hubs H' are furnished with spur gears K' which gear with and derive motion from the two gears E on the cylinder carrier for the purpose of producing the rotation of the roller carrier $H'h'$ and producing the revolution of the rollers j' around the axes of the gudgeons b' of the second form bed B' . The purpose of the rollers j and j' is to draw the web to and from the beds and to control its movement through the machine.

The gears EGL are so proportioned that the impression cylinders will rotate about their own axes once during each fourth of their revolution about the axis of their carrier Dd . The gears $k k'$ of the roller carriers are the same size as those of their driving gears E on the cylinder carrier shaft D' so that the rollers $j j'$ make the same number of revolutions about the form bed gudgeons b, b' as the impression cylinders make about the axis of the carrier shaft; and the meshing of the said gears $E k k'$ is such that the rollers $j j'$ will always intervene exactly midway between the impression cylinders in their respective revolutions.

The paper or other material to be printed in this machine is supplied in the form of a continuous web. This web is indicated by dotted line m in Fig. 1, in which figure its course may be traced by arrows. This course is from the roll n between guiding tapes $o o$, thence upward between the first form bed B and one of the impression cylinders C where it receives the first impression, thence through a turning apparatus M which will be presently described, at the top of the machine, thence downward between the second form bed B' and one of the impression cylinders C where it receives the second impression, thence between guiding tapes $p p$ and $q q$ to delivery rollers $w w$ beyond which there may be located a cutting apparatus for cutting the printed web into sheets.

The drawing off of the web from the roll n and the proper control of the web between the roll n and the first form bed, between the said form bed and the turning apparatus, between the turning apparatus and the second form bed and between the second form bed and the delivery apparatus are all performed by means of the rollers j and j' in the two rotary carriers Hh and $H'h'$. The radial adjustment of these rollers in the arms $h h'$ provides for keeping a greater or less length of web between two proximate ones of the said rollers

and provides for the prevention of any slackness in the web and keeps the web at a proper tension for printing.

It may be understood by reference to Fig. 2, that the impression cylinders C being arranged in pairs on opposite sides of their carrier, one of the impression cylinders C is printing from the second form on the bed B' while another of the said cylinders C is printing from the first form on the bed B , each of the said form beds thus forming an abutment to that impression cylinder which is operating upon the other form bed.

The turning apparatus for turning the web between the form beds is represented as consisting of an arched framing M supported on the side frames in which are journaled rollers $r r s t$ and between which are secured stationary bars $u v$, the rollers $r r s$ being parallel with the cylinders, the roller t being at right angles thereto and the stationary bars $u v$ being diagonal to the said rollers. The web passes first over the rollers $r r$, then over and under the diagonal bar v to the roller t under which it runs back to and over the diagonal bar u whence it runs to and over the roller s . As such turning apparatus is well known no further description of it is necessary.

The rollers j and j' for controlling the movements of the web are described as being journaled in bearings carried by the arms h and h' , but the said rollers may consist simply of bars secured between the said arms.

It is obvious that this machine will require to be furnished with suitable inking apparatus but this I have not thought necessary to include in the same patent with the subject-matter herein described and claimed.

What I claim as my invention is—

1. In a perfecting printing machine, the combination of two stationary form beds facing each other, a rotary carrier having its axis midway between said form beds, impression cylinders arranged as a pair and journaled in said carrier on opposite sides of the said axis to operate between the said form beds, and means of producing the rotary motion of said cylinders while they revolve with said carrier about its axis, substantially as herein set forth.

2. In a perfecting printing machine, the combination of two stationary flat form beds facing each other, a rotary cylinder carrier having its axis midway between said form beds, a series of impression cylinders of approximately elliptical form journaled in bearings in said rotary carrier equidistant from its axis, and means of producing the rotary motion of said cylinders in said bearings while they revolve with said carrier about its axis, substantially as herein set forth.

3. In a perfecting printing machine, the combination of a central rotary carrier, two form beds arranged facing each other on opposite sides of said carrier equidistant from the axis thereof, a series of impression cylin-

ders journaled in said carrier at equal distances from the axis thereof, means for carrying a web of paper from one to the other of said form beds over said rotary carrier and means for turning over the said web arranged above said rotary carrier, substantially as herein set forth.

4. In a perfecting printing machine, the combination of two stationary form beds facing each other, a cylinder carrier arranged between said form beds, impression cylinders journaled in said carrier, gears fast on said cylinders, a loose gear on said carrier gearing with said gears on the cylinders, a gear fast on said carrier, a driving shaft, and gears on the driving shaft gearing one with the fast and the other with the loose gear on the carrier; all substantially as herein set forth.

5. In a perfecting printing machine, the

combination of two stationary form beds facing each other, a cylinder carrier arranged between said form beds, impression cylinders journaled in said carrier on opposite sides of the axis thereof, rotary roller carriers on opposite sides of the said carrier, rollers in each of said roller carriers corresponding in number with and intervening between said cylinders, means for producing the rotation of said cylinder carrier and roller carriers and means for producing the rotation of the impression cylinders on their own axes; substantially as herein set forth.

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

WILLIAM H. BLAKENEY.

Witnesses:

FREDK. HAYNES,
GEORGE BARRY.