

(No Model.)

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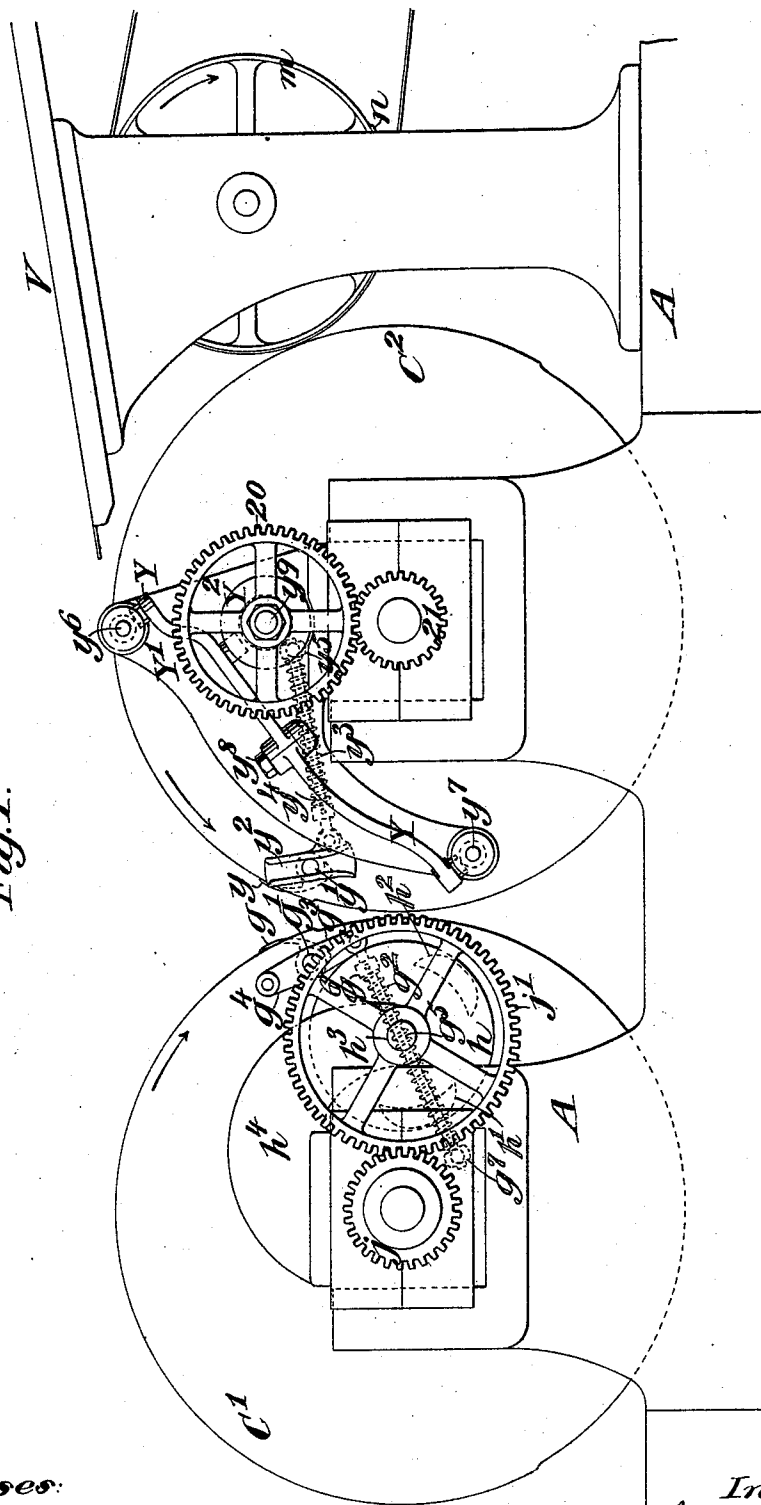
J. C. HEMPHILL.

OFFSET MECHANISM FOR PRINTING MACHINES.

No. 539,269.

Patented May 14, 1895.

Fig. 1.



Witnesses:
O. Sundgren
George Barry.

Inventor:
James C. Hemphill
by attorneys
Barnett & Seaver

(No Model.)

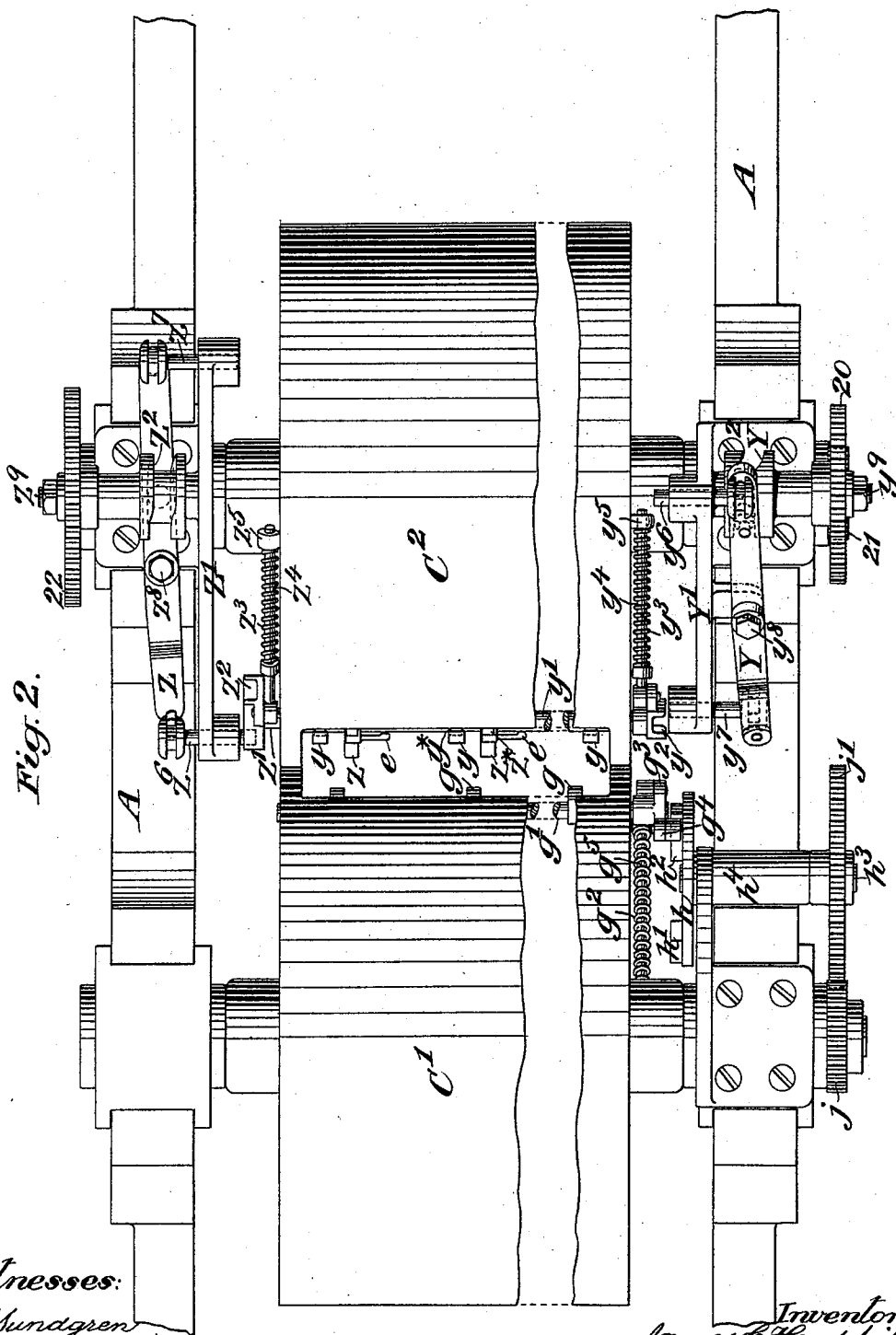
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J. C. HEMPHILL.

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No. 539,269.

Patented May 14, 1895.



Witnesses:

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(No Model.)

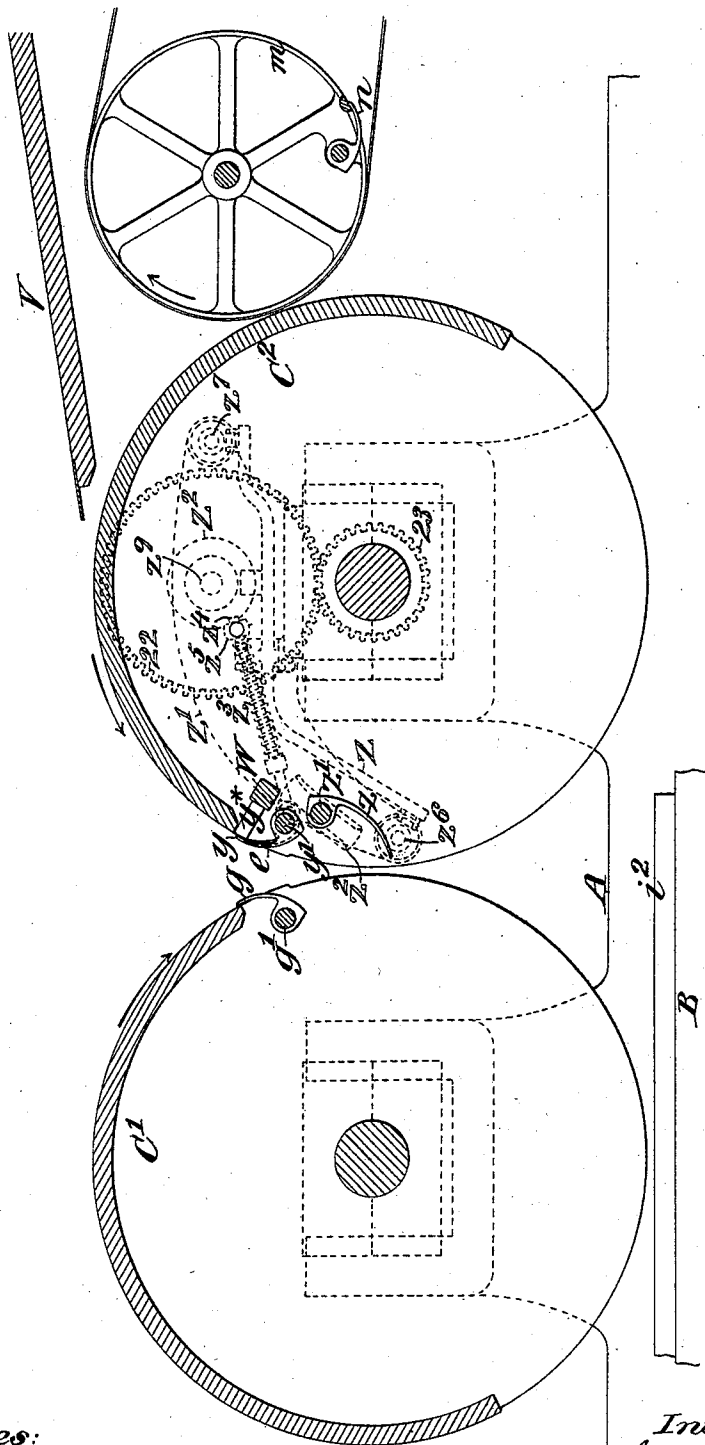
5 Sheets—Sheet 3.

J. C. HEMPHILL.
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Fig. 3.



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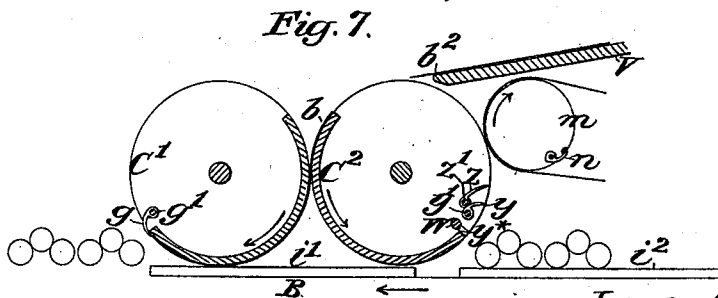
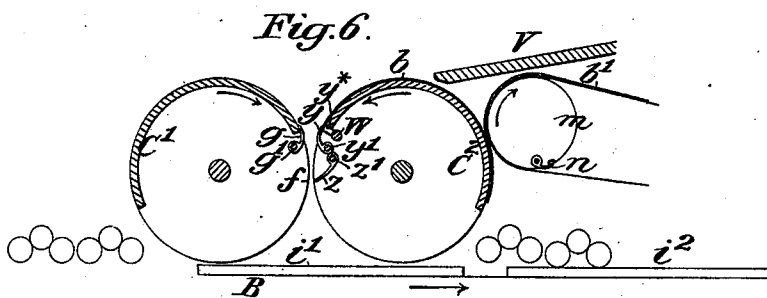
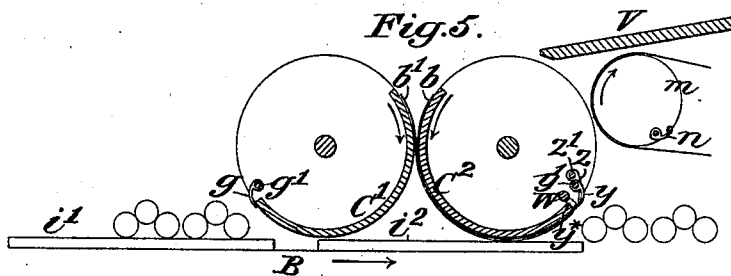
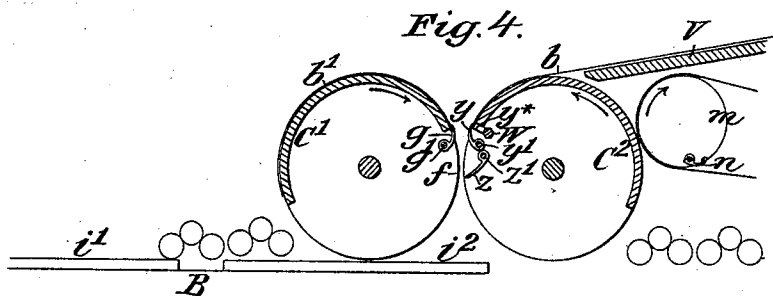
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OFFSET MECHANISM FOR PRINTING MACHINES.

No. 539,269.

Patented May 14, 1895.



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(No Model.)

5 Sheets—Sheet 5

J. C. HEMPHILL.

OFFSET MECHANISM FOR PRINTING MACHINES.

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Patented May 14, 1895.

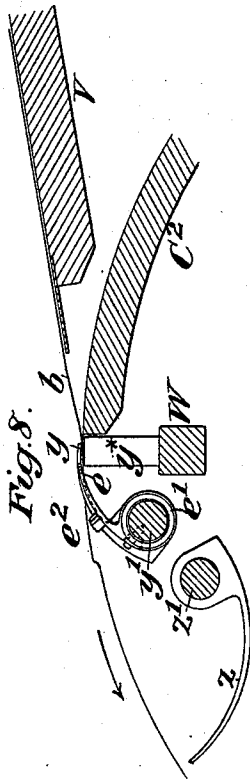


Fig. 8.

Fig. 9.

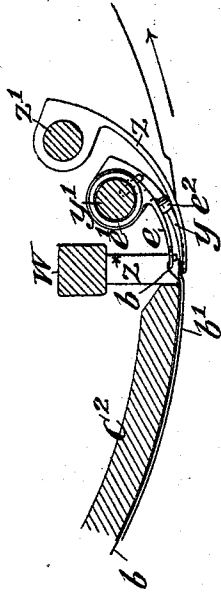
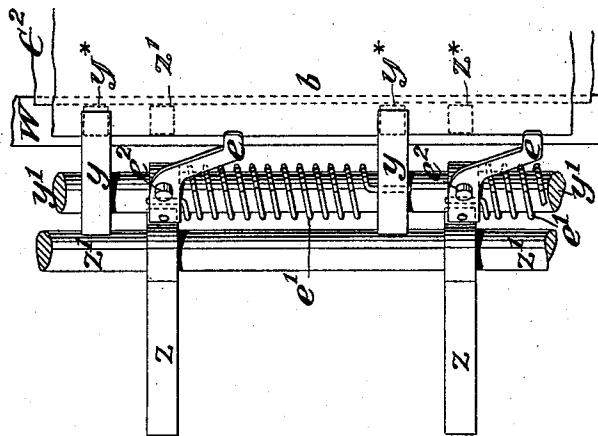


Fig. 10.



Witnesses:
O. Sundgren
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Inventor:
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UNITED STATES PATENT OFFICE.

JAMES C. HEMPHILL, OF WESTERLY, RHODE ISLAND, ASSIGNOR TO THE C. B. COTTRELL & SONS COMPANY, OF JERSEY CITY, NEW JERSEY, AND STONINGTON, CONNECTICUT.

OFFSET MECHANISM FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 539,269, dated May 14, 1895.

Application filed February 25, 1895. Serial No. 539,551. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. HEMPHILL, of Westerly, in the county of Washington and State of Rhode Island, have invented a new and useful Improvement in Offset Mechanism for Printing-Machines, of which the following is a specification.

This improvement relates to means for carrying out the invention which is the subject-matter of my application for Letters Patent, Serial No. 521,933, according to which invention, in the printing on both sides of sheets, each sheet is made to constitute its own offset sheet, or, in other words, each sheet is made to serve as an offset sheet, to receive the offset from a sheet previously printed, before it receives its own printed impression.

I will proceed first to describe the improvement in detail with reference to the accompanying drawings and afterward to point out its novelty in claims.

Figure 1 is a side view of the two impression-cylinders and as much of the adjacent parts of a flat-bed perfecting printing-machine as is necessary to illustrate my improvement. Fig. 2 is a plan view corresponding with Fig. 1. Fig. 3 represents a vertical section taken parallel with the side view, Fig. 1. Figs. 4, 5, 6, and 7 are diagrams, each representing a vertical section of the impression-cylinders, the feed-board, delivery-reel, and forms of a printing-machine, the said four figures showing the parts in different positions to illustrate the successive stages of the operation. Figs. 8 and 9 represent, on a larger scale, vertical sectional views of portions of the second impression-cylinder and its grippers, Fig. 8 representing also a portion of the feed-board. Fig. 10 represents a plan of a portion of the impression-cylinder and parts of its grippers corresponding with Fig. 8.

A designates the framing.

B indicates the line of the form bed.

C' C² designate respectively the first and second impression cylinders, and V the feed-board which is arranged over the second impression cylinder C², for feeding the sheets first to that cylinder whereon they serve as the offset. *i' i²* are respectively the first and

second forms on the bed B. These cylinders and the form bed may be driven in the same way as the cylinders and bed of flat bed perfecting machines in common use.

The first impression cylinder C' is furnished with only one set of grippers *g*, as is usual. The second impression cylinder is furnished with two sets of grippers *y* and *z*, of which *y* take the clean sheet from the feed-board V and carry it over the impression surface of the second impression cylinder, whereon it first serves as a tympan or offset sheet, and then deliver it to the grippers *g* on the first impression cylinder, whence after having been printed on one side, it is delivered to those *z* on the second impression cylinder by which it is again carried over the impression surface of the latter cylinder to take the impression on the second side.

The grippers *y* and the shaft *y'* which carries them are like those commonly employed on impression cylinders and they are represented as operating in a well known manner with pads *y** which project from a bar W which is fixed between the heads of the cylinder. The grippers *z* are longer than *y* and their shaft *z'* is arranged behind the shaft *y'* or farther back within the cylinder than the said shaft *y'*, the said grippers reaching over the said shaft *y'* to operate with other pads *z** arranged on the same bar W with the pads *y** at intervals between the latter.

The shaft *g'* carrying the grippers *g* of the first impression cylinder may have its properly timed opening and closing movements produced in any known or suitable manner. The said shaft is represented (see Figs. 1 and 2) as having a spring *g²* applied to it in the usual way to close the grippers and as operated upon for the purpose of opening the grippers by means of two cams *h' h²* carried by a disk *h* on a short shaft *h³* which works in a bearing in a bracket *h⁴* on the framing. The cam shaft *h³* derives rotary motion through two spur gears *j j'*, one on the shaft of the cylinder C' and the other on the said shaft *h³*, the said gears being so proportioned that the shaft *h³* makes one revolution for every two revolutions of the cylinder. The said spring and the said cams operate respect-

ively on the gripper shaft g' through two arms $g^3 g^4$ provided on the said shaft outside of the cylinder. The cam h' is for opening the grippers g to take from the second impression cylinder, the imprinted sheet which has served as a tympan or offset sheet; and the cam h^2 is for opening the said grippers to again deliver the sheet to the second impression cylinder after the printing of its first side. The closing spring g^2 is coiled upon a rod g^5 connected with the arm g^3 and is compressed between a collar g^6 on the said rod and a guide g^7 on the cylinder through which the rod works. The opening cams h' h^2 operate against a roller on the end of the arm g^4 of the gripper shaft.

The shafts y' and z' which carry respectively the grippers y and z of the second impression cylinder, may also have their properly timed opening and closing movements effected in any known or suitable manner. The said shafts are represented (see Figs. 1, 2, and 3) as respectively provided for this purpose with tumblers y^2 and z^2 to which are respectively applied springs y^3 and z^3 . The tumblers y^2 and z^2 are represented as arranged at opposite ends of their respective shafts y' and z' and consequently at opposite ends of the cylinder C^2 . The springs y^3 and z^3 are represented as applied in a well known manner to shouldered rods y^4 and z^4 , which are connected with the tumblers and work through guides $y^5 z^5$ on the cylinder. The said tumblers y^2 and z^2 are operated upon at the proper times by being carried by the revolution of the cylinder C^2 over pins $y^6 y^7$ and $z^6 z^7$ attached to opposite ends of levers Y and Z which work on fulcrum pins $y^8 z^8$ which are carried by fixed brackets Y' and Z' bolted to the framing A . The pins $y^6 y^7 z^6 z^7$ are movable by the said levers toward and from the cylinder through guides provided for them on the said brackets but they are otherwise stationary.

The lever Y is operated upon at the proper times to push in the cam pins y^6 and y^7 respectively toward the cylinder into their operative positions and to withdraw them from such positions by means of a grooved cam Y^2 on a shaft y^9 which works in a bearing in the bracket Y' , the said lever being furnished with a pin or roller which works in the groove of said cam. The cam shaft y^9 is furnished with a spur gear 20 gearing with a spur gear 21 of half the size on the shaft of the cylinder C^2 , the cam Y^2 thereby making one revolution for every two of the cylinder. The lever Z is operated upon at the proper time to push in the pins z^6 and z^7 respectively to their operative positions and to draw them out therefrom by its engagement with a grooved cam Z^2 on a shaft z^9 which works in a bearing in the bracket Z' . The cam shaft z^9 is geared with the cylinder shaft to make one revolution for every two of the cylinder by means of spur gears 22, 23.

On the gripper shaft y' there are loosely fitted a set of fingers e the points of which

come between the grippers y of the first set. These fingers are connected with the grippers y by springs e' which are coiled upon the shaft y' and which tend to hold the said fingers to a position in which the sheet may pass under them when it is first taken by the grippers y from the feed-board. The said fingers are furnished with projections e^2 upon which the second set of grippers z bear in closing and so depress the said fingers within the cylinder and correspondingly depress the edge of the fresh sheet b which is being carried for the first time around the cylinder C^2 by the grippers y as shown in Fig. 9, that a sheet b' printed on both sides may be taken from the said cylinder by the grippers n of a delivery reel m without the latter grippers interfering with the said sheet b which up to that time has only served as an offset sheet.

The delivery apparatus used in carrying out this invention for taking the sheets printed on both sides from the cylinder C^2 , may be of any known or suitable kind. I have represented for that purpose such a delivery reel m furnished with grippers n as is commonly employed for taking the sheets from the cylinder of a back delivery press and as such a device and the means of operating its grippers are well understood I do not think it necessary to particularly describe them. The cylinders must be furnished with lift and trip mechanism which may be of the same kind as is commonly used in flat bed perfecting machines and therefore need not be herein described.

Having described in detail the devices necessary to the carrying out of my invention, I will now describe with reference to the diagrams Figs. 4, 5, 6, and 7, the printing operation.

Referring first to Fig. 4, the cylinders rotating in the direction of the arrows shown upon them, a sheet b' is fed from the board V to the grippers y of the second impression cylinder C^2 , which cylinder should at this time be tripped so that it cannot descend to print this sheet but will deliver it unprinted to the grippers g of the first impression cylinder C' when, after having made about one and a quarter revolutions with the second impression cylinder C^2 , it comes for a second time to the point f . The grippers g of the first impression cylinder C' then take the sheet b' and the latter receives an impression from the first type form v' , and as the grippers y come for the third time to the point of feeding they take a second sheet b and shortly afterward the two cylinders reach the position shown in Fig. 4, the first impression cylinder C' having upon it the first sheet b' printed on its outer side and the second impression cylinder C^2 having upon it the clean second sheet b as shown in the said figure. When the gripper edges of the impression surfaces of the two cylinders reach the point f , for the third time the grippers z of the second impression cylinder C^2 seize the front edge of the first

sheet b' which is at this time released by the grippers g of the first impression cylinder. The first sheet b' is now taken by the second impression cylinder C^2 and receives its second impression, on the opposite side, from the form i^2 as illustrated in Fig. 5, after which it is taken by the grippers n of the delivery reel m and released by the grippers z , while the second sheet b held by the grippers y goes on as shown in Fig. 6, to be taken to the cylinder C' on which it receives its first impression from the form i' as shown in Fig. 7.

It will be understood by reference to Fig. 5, that the freshly printed side of the sheet b' is pressed against the sheet b while the said sheet b' is receiving its second impression. Thus some of the letters of the second form i^2 may show on the sheet b . When the grippers y again reach the feeding position they take a third sheet b^2 and in about a quarter of a revolution later the grippers z take the second sheet b from the cylinder C' and give it its second impression on the form i^2 . The latter sheet b being on the outside will now receive print over the same places which received the offset when it was under the sheet b' while the latter received its second impression. The sheet b is then delivered to the delivery reel and the sheet b^2 will go to the cylinder C' to receive its first impression. This operation is repeated each sheet receiving the offset from the second impression on a previously printed sheet and afterward taking its own second impression on the said offset.

In the example which I have herein given of my invention, I have represented the second impression cylinder C^2 and the feed-board so arranged that the clean sheets may be fed to said cylinder directly from the feed-board by hand, that being the simplest illustration of

the means for feeding, but it is obvious that any known or suitable means of feeding the sheets to said cylinder may be adopted.

What I claim as my invention is—

1. The combination with the first and second impression cylinders of a perfecting printing machine, of a set of grippers on the second impression cylinder for receiving a clean sheet, a set of grippers on the first impression cylinder for taking the said sheet from the second impression cylinder, and a second set of grippers on the second impression cylinder for taking the sheet from the first impression cylinder, substantially as herein set forth.

2. The combination with the impression cylinder of a printing machine and two sets of grippers thereon for receiving two separate sheets one over the other, of a set of depressing fingers arranged between the grippers which receive the inner sheet to depress the edge of the said sheet between the latter grippers, substantially as and for the purpose herein set forth.

3. The combination with the impression cylinder of a printing machine, of a gripper shaft and grippers thereon for taking one sheet, depressing fingers arranged loosely on said gripper shaft for depressing between the said grippers the edge of said sheet, a spring applied to said fingers to relieve the sheet from their pressure, a second gripper shaft and grippers thereon for taking another sheet, said second set of grippers also operating to depress said fingers, substantially as herein set forth.

JAMES C. HEMPILL.

Witnesses:

A. R. STILLMAN,
B. F. LAKE.

Correction in Letters Patent No. 539,269.

It is hereby certified that in Letters Patent No. 539,269, granted May 14, 1895, upon the application of James C. Hemphill, of Westerley, Rhode Island, for an improvement in "Offset Mechanism for Printing Machines," an error appears in the printed specification requiring correction, as follows: In line 5, page 2, the word "imprinted" should read *unprinted*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 21st day of May, A. D. 1895.

[SEAL.]

JNO. M. REYNOLDS,
Assistant Secretary of the Interior.

Countersigned:

JOHN S. SEYMOUR,
Commissioner of Patents.