

(No Model.)

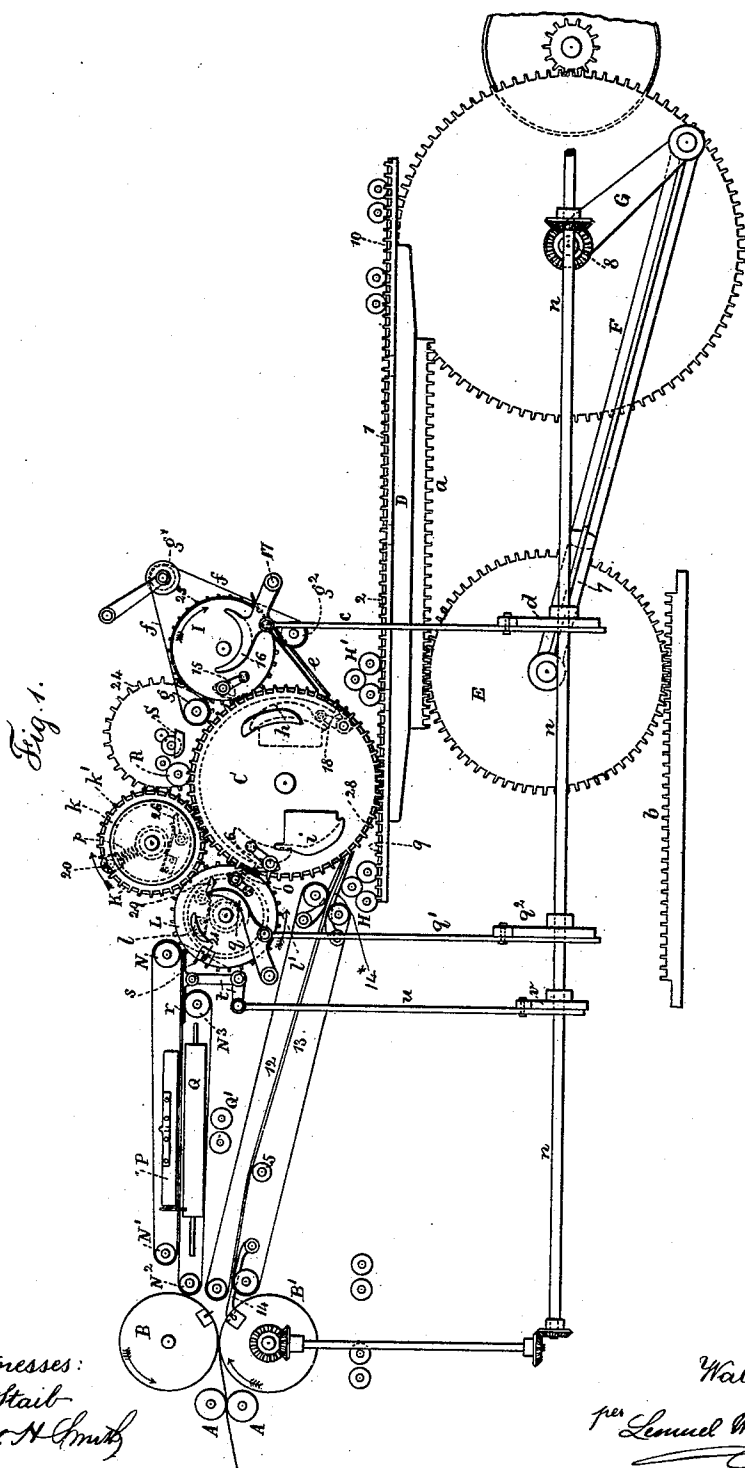
5 Sheets—Sheet 1.

W. SCOTT.

OSCILLATING CYLINDER PRINTING PRESS.

No. 487,495.

Patented Dec. 6, 1892.



Witnesses:
J. Stail
Chas. A. Smith

Inventor:
Walter Scott
per Samuel W. Fenell atty

(No Model.)

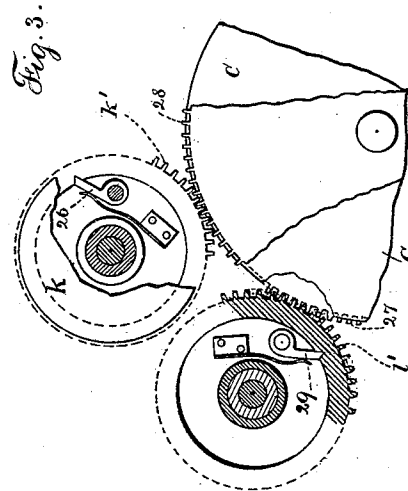
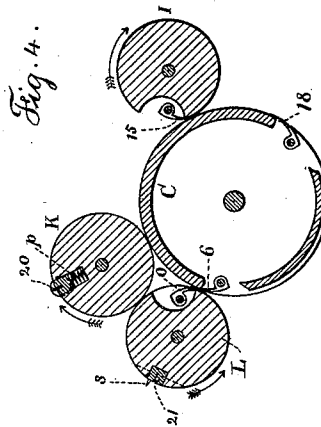
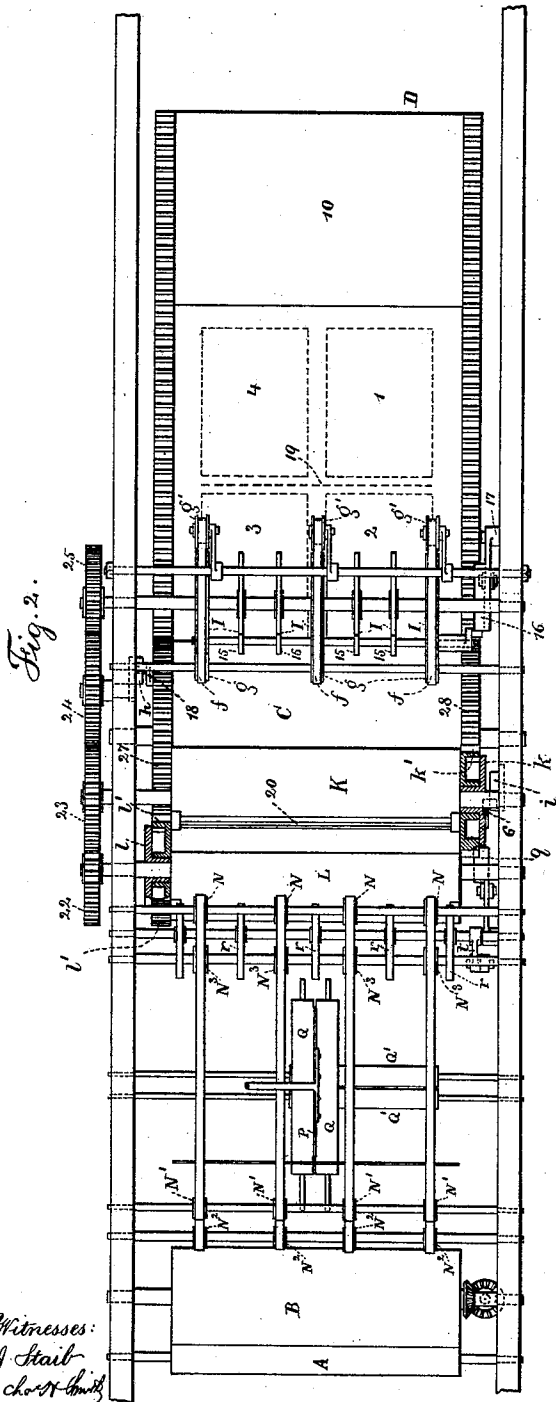
5 Sheets—Sheet 2.

W. SCOTT.

OSCILLATING CYLINDER PRINTING PRESS.

No. 487,495.

Patented Dec. 6, 1892.



Inventor:

Walter Scott.

per Lemuel W. Ferrell atty

(No Model.)

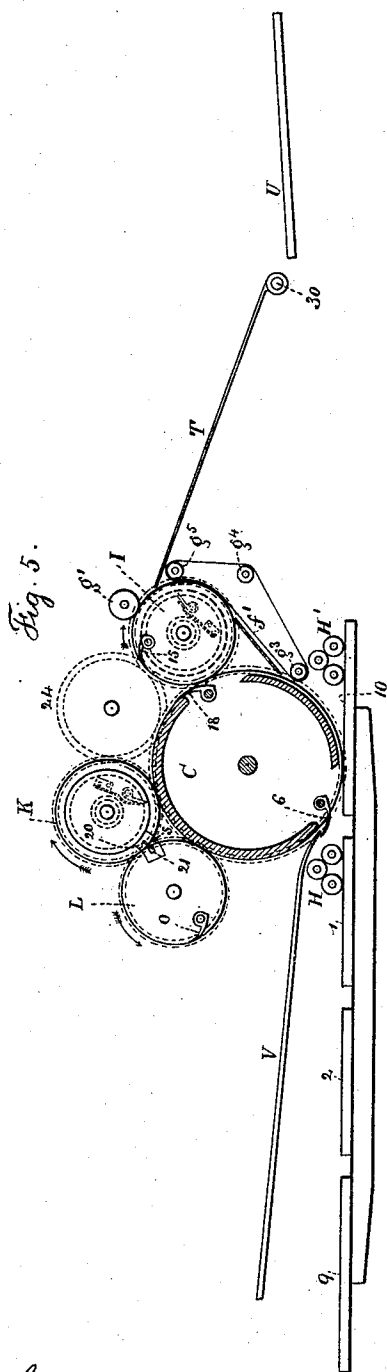
5 Sheets—Sheet 3.

W. SCOTT.

OSCILLATING CYLINDER PRINTING PRESS.

No. 487,495.

Patented Dec. 6, 1892.



Witnesses:
J. Stait
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W. SCOTT.

OSCILLATING CYLINDER PRINTING PRESS.

No. 487,495.

Patented Dec. 6, 1892.

Fig. 7.

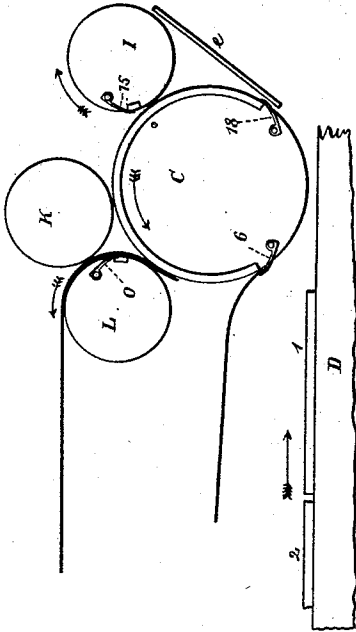


Fig. 9.

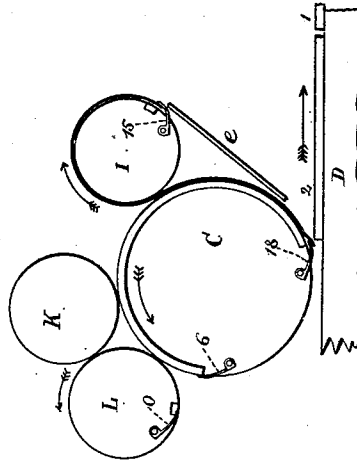


Fig. 6.

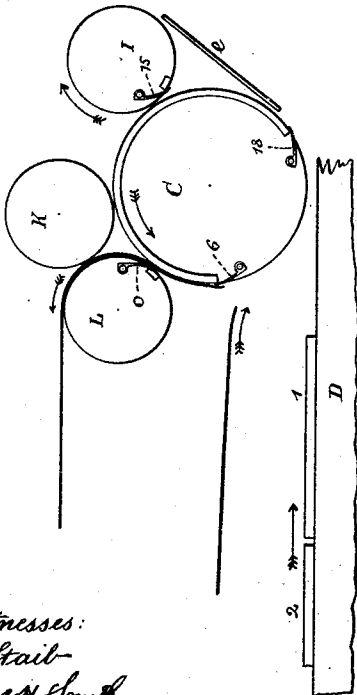
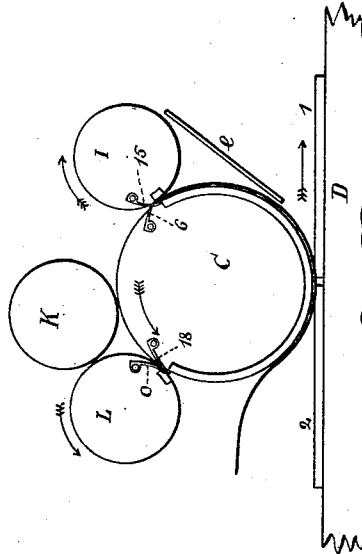


Fig. 8.



Witnesses:
J. Strait
Charles Smith

Inventor:
Walter Scott
per Lemuel W. Merrill atty.

(No Model.)

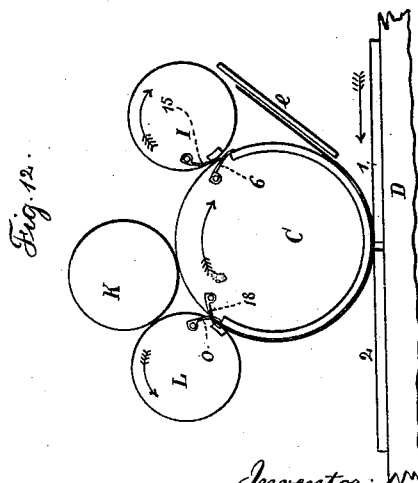
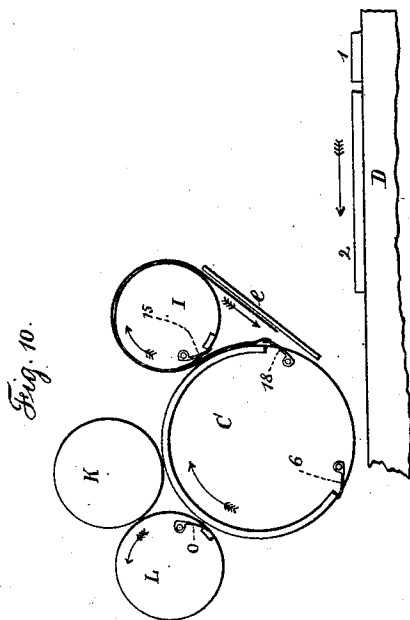
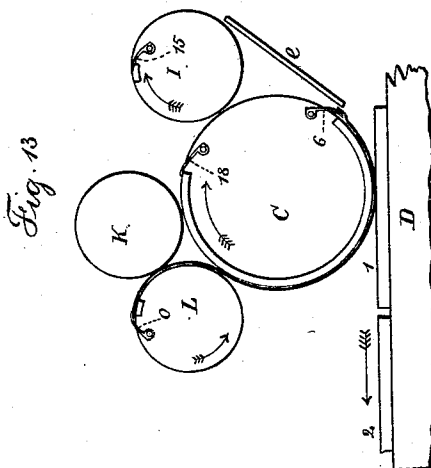
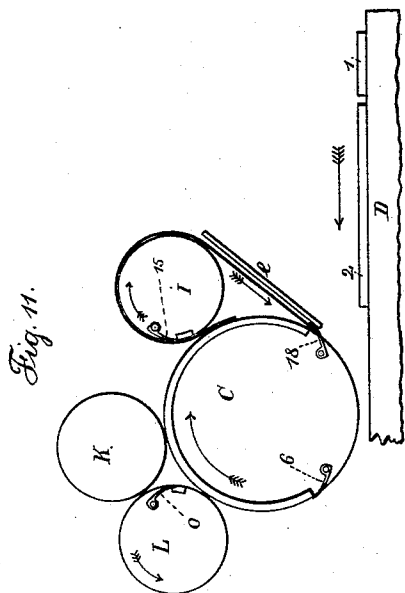
5 Sheets—Sheet 5.

W. SCOTT.

OSCILLATING CYLINDER PRINTING PRESS.

No. 487,495.

Patented Dec. 6, 1892.



Witnesses:
J. Stait
Chas N. Smith

Inventor: Walter Scott
per Lemuel W. Terrell atty.

UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

OSCILLATING-CYLINDER PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 487,495, dated December 6, 1892.

Application filed July 23, 1890. Serial No. 359,623. (No model.)

To all whom it may concern:

Be it known that I, WALTER SCOTT, a citizen of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented an Improvement in Oscillating-Cylinder Printing-Presses, of which the following is a specification.

In this printing-press there is a bed that is reciprocated, and the impression-cylinder receives its motion from racks near the edges of the bed gearing with wheels at the ends of the impression-cylinder, and upon this impression-cylinder are two sets of grippers acting in opposite directions, and the sheet is fed in from a roll and cut off of the proper length and taken by one set of grippers, so as to receive an impression upon one side as the bed is moving in one direction, and the advancing end of the sheet is carried upwardly and over a sheet-reversing cylinder and brought down again and seized by the second set of grippers, so as to receive the second impression upon the opposite side, and the forms or type are so arranged upon the bed that two complete separable products are produced, the head of the sheet coming at one impression to one end of the bed and upon the other impression to the other end of the bed in order that the impressions upon the two sides may stand in the proper relation to each other and produce two perfect products adapted to be separated, and the advancing end of the sheet after the second impression is carried up and received by the grippers upon a take-up cylinder the circumference of which corresponds, or nearly so, to the length of the paper, and there is a second cylinder acting with the said cylinder for separating the two products, and upon the first rotation of this cutting-cylinder the first of the two complete products is taken off to the folding device and the second is carried around by pins and delivered during the second rotation of the said cylinder to the folding devices. By this improvement the two sides of the sheet are printed and the two sheets delivered and cut apart and one sheet is folded during the reciprocation of the bed in one direction and the other sheet is folded during the reciprocation of the bed in the other direction, and in order to drive the sheet-reversing cylinder continuously in one direc-

tion as the impression-cylinder oscillates I make use of loose gears on the cutting and take-up cylinders with pawl connections in such a way that motion is given to the cutting-cylinders and the sheet-reversing cylinder in one direction by one pawl during the movement of the bed in one direction, and the motion is continued in the same direction by the other pawl during the movement of the bed in the opposite direction.

In the drawings, Figure 1 is a diagrammatic elevation of the operative parts without the frame. Fig. 2 is a plan view with the pawl-gearing partly in section, and Fig. 3 is a diagrammatic elevation; partly in section, of the pawl connections and gearing. Fig. 4 is a section of the cylinders to more clearly show the grippers, and Fig. 5 is a diagram of the press with a fly for delivering the sheets. The diagrams Figs. 6 to 13 indicate the positions of the parts at various times in the movements of the sheet.

The sheet of paper passes between the feed-rolls A to the cutting-cylinders B B', and it is conveyed by the sets of tapes or belts 12 13 to the impression-cylinder C, there being by preference guide-bars 14* to direct the advancing end of the sheet to the grippers upon the impression-cylinder, and by making use of a roller 5 at the proper position in the length of the belts 12 and 13 the said belts forward the paper properly to the grippers 6 on the impression-cylinder, and the belts should diverge slightly as they approach the impression-cylinder to allow the sheet to be drawn out freely by the grippers of the said impression-cylinder. The cutters on the cylinders B B' entirely separate one sheet from the next.

The bed D is of any ordinary character and provided with a rack *a* upon its under surface, into which the wheel E gears, and this wheel E rests upon the base-rack *b*, and it is received into a fork 7 of the connecting-rod F, that passes to the crank G upon the shaft 8, which shaft is driven in any suitable manner, and by the movement of the shaft and crank G the wheel E is rolled back and forth upon the base-rack *b* and gives a reciprocating motion to the rack *a*, and bed D, which reciprocating movement of the bed is twice the distance that the axis of the gear-wheel E is

moved by the connecting-rod and crank. This construction of reciprocating bed and mechanism for moving the same is well known in printing-presses, and my present improvements are especially adapted to use in a printing-press having this mechanism for reciprocating the bed; but I do not limit myself in this particular.

I remark that the ink-tables 9 and 10 toward the ends of the reciprocating bed D and the sets of inking-rollers H H' are of any suitable or desired character, and in order to advantageously make use of the present improvements the forms upon the reciprocating bed should be adapted to four or eight page impressions and properly placed in relation to each other for printing in the manner hereinafter described.

I have indicated by dotted lines four forms, (numbered 1 2 3 4,) so as to be adapted to printing two complete products. The sheet-reversing cylinder I is at the opposite side of the impression-cylinder C to the paper-supplying belts or tapes 12 13, and it is to be rotated only in one direction and moved progressively, as hereinafter described, and it is provided with grippers 15, and there is a movable cam 16 for opening the grippers, such grippers being closed, as usual, by a spring, and this movable cam 16 is pivoted at 17 and acted upon by a connecting-rod *c*, having a roller against which the cam *d* operates to move the gripper-cam 16 out of the way to allow the grippers to remain closed and to bring such cam 16 into position for opening the grippers and allowing them to close at the proper time on the sheet, and also for opening the grippers to deliver the sheet down between the ranges of bars *e*, and it is preferable to make use of two or more endless tapes or belts *f*, passing around pulleys *g g' g''* to bear against the paper as it is carried around the sheet-reversing cylinder I to cause such sheet of paper to be moved with and at the same speed as the sheet-reversing cylinder, even after the grippers 15 have been opened for the advancing end of the sheet to pass down between the ranges of bars *e*. There is a second set of grippers 18 upon the impression-cylinder C, and the cam *h* for opening the grippers 18 is at one end of the cylinder C and the cam *i* for the grippers 6 is at the other end of the cylinder C, so that these grippers are opened and closed at the proper times and the arm of one set of grippers does not come in contact with the cam for the other set of grippers.

The operations of the parts thus far described are as follows: The sheet of paper as it passes in and is cut by the cylinders B B' is delivered by the sets of belts 12 and 13 to the first set of grippers 6, and at the time these grippers 6 seize the sheet of paper the bed D is near its extreme motion beneath the cylinder C and sets of belts 12 13, and as the bed D moves along beneath the cylinder C the sheet of paper receives one impression

and the grippers 6 carry the advancing end of the sheet up until the same is adjacent to the sheet-reversing cylinder I, at which moment the grippers 6 open as the grippers 15 close and carry the sheet over and around the sheet-reversing cylinder I, and then the grippers 15 open as the advancing end of the sheet passes in between the ranges of bars *e*; but before the advancing end of the sheet has reached the lower ends of the ranges of bars *e* the bed D has commenced to move in the opposite direction and the second set of grippers 18 close upon the advancing end of the sheet and carry the same down beneath the impression-cylinder, giving a second impression upon the opposite surface of such sheet of paper, and in order to bring the pages in the proper position the forms should be arranged upon the bed in the order in which they are numbered, so that when the sheet has been printed upon one side and reversed, in receiving the impression upon the opposite side the pages will come in the proper order to make two complete products each of four pages. It, however, is to be understood that the forms might be subdivided to print eight or sixteen pages, so that the two sheets will receive additional folds in the manner well known in book-printing, and it is to be understood that this machine is especially adapted to the printing of two products, the sheet being afterward separated at the place indicated by the line 19, Fig. 2, and the two products are delivered and folded by the devices next described.

The cutting-cylinders K and L are connected by the gears 22 and 23, and there is an intermediate 24 to the gear 25 upon the shaft of the sheet-reversing cylinder I, and the gears 22 23 25 are of the same size and their pitch-lines correspond to the circumference of the respective cylinders I K L. Hence such three cylinders revolve in harmony and the circumference of each cylinder corresponds in length to half the travel of the bed D, and these three cylinders receive motion from the oscillating impression-cylinder C, that is moved by the bed D. Hence the cylinders I K L make two complete revolutions by the movement in one direction of the bed D, and in order to continue the movements of these three cylinders in the same direction to make two revolutions upon the return motion of the bed I employ any suitable mechanism that is adapted to be acted upon by the impression-cylinder or from any other part of the press and in harmony with the impression-cylinder; but the motion must be progressive and in the same direction, instead of being first one way and then the other. I find the following mechanism well adapted to this object: Upon one end of the cylinder K is a disk *k*, permanently fastened to the shaft and carrying the pawl 26, and this pawl is within a loose gear-wheel *k'*, that is free to revolve around the hub of the disk *k*, and this gear-wheel *k'* is permanently in gear with the

gear-wheel 28 at that end of the impression-cylinder C. At the other end of the cylinder L is a disk *l*, permanently fastened upon the shaft of the said cylinder L, and the gear-wheel *l'* is loose upon the hub of the disk *l*, and its teeth are continually in gear with the gear 27 at this end of the cylinder C, and the gears *k' l'* are hollow, so as to allow the pawls 26 and 29 to be between the disks and gears, respectively, and upon the inside of the hollow gears there are notches into which the ends of the respective pawls are received, and these parts are located in such positions that the pawls fall into the notches at the ends of the movements of the bed. Hence it will be apparent that when the bed is going in one direction the pawl 26 will engage the gear *k'* and when going in the opposite direction the pawl 29 will engage the gear *l'*, and each pawl will be in position when the bed pauses, so that one pawl will commence to operate in turning one of the cylinders as the other pawl goes out of action by the interior surface of the gear moving away from the point of the pawl, and no matter which way the impression-cylinder may be turning the three cylinders I K L will be rotating in the directions indicated by the arrows and will make two complete rotations every reciprocation of the bed in either direction, thus making four revolutions for each complete movement of the press.

Upon the cutting-cylinder K is a blade 20, and upon the cutting-cylinder L is a groove 21, and upon the cylinder L are grippers *o*, and these grippers are nearly opposite to the groove 21, and the position and timing of the parts is such that the grippers *o* are in position to take the sheet from the second set of grippers on the cylinder C after the sheet has received the two impressions, as before mentioned, and such grippers *o* carry the sheet around upon the cylinder L, and the blade 20 separates the printed sheet at the line corresponding with the line 19, and there are pins *s* adjacent to the groove 21, which pins pass into the advancing end of the second sheet and the first sheet is delivered from the grippers to the folding device next described during the first revolution of the cylinder L, and the second sheet remains in position upon the cylinder L and is carried by the pins *s* during the second revolution of the cylinder L, and the sheet is delivered during the third revolution of such cylinder L to the folding device, the object being to give the time requisite for the folding operations, as by this arrangement the same period of time, or nearly so, is allowed for each folding operation.

I remark that any suitable folding mechanism may be made use of; but I prefer to employ the sets of tapes or belts around the pulleys N N' N² N³, and there is a folding-blade shown at P and folding-rollers at Q, and there may be a second set of folding-rollers at Q', as provided in ordinary folding-machines. I, however, find it advantageous to make use of the

vibrating bridge-bars *r*, that are connected to the bell-crank lever *t* and receive motion from a rod *u* and cam *v*, which cam is so shaped and timed that the ends of the bridge-bars *r*, adjacent to the cylinder L, receive the advancing end of the sheet as the grippers *o* are opened, and then the bridge-bars *r* are moved endwise sufficiently to prevent taking the end of the second sheet during the first revolution of the cylinder L, and then the cam *v* moves the parts to bring the ends of the bridge-bars *r* beneath the advancing end of the second sheet to lift such sheet off the pins *s* and cause the said sheet to pass along to the folder during the third revolution of the cylinder L.

It is advantageous to prevent the edge of the blade 20 injuring the surface of the impression-cylinder C when passing adjacent to the same. With this object in view it is preferable to mount the blade 20 upon a sliding stock movable radially to the cylinder K and to introduce springs *p* beneath the stock of the blade 20, as represented by dotted lines in Fig. 1 and full lines in Fig. 4, and to provide rollers at the ends of the blade to roll upon the surface of the impression-cylinder and press the blade into the cylinder K and keep its edge from contact with such cylinder C. There are depressions in the cylinder L at the ends of the groove 21 to allow the springs to keep the knife projected during cutting-operation.

The grippers *o* upon the cylinder L only require to be opened and closed when the sheets are to be received and delivered. I therefore provide a cam *q*, which is pivoted upon the frame and moved by a link *q'* and cam *q²* upon the shaft *n*, that carries the cam *v*, and it will be observed that this shaft *n* is rotated once for each complete movement of the press. Hence the cam *q²* can be of the proper shape to bring the grippers into and out of action, as required, and it will also be observed that the movable cam 16 for the grippers 15 is also brought into position for action at the proper times by the cam *d* upon the shaft *n* in order that such grippers 15 may not be opened except at the proper time to receive and deliver the sheet.

In Fig. 6 the parts are in the positions for delivering a printed sheet with a fresh sheet passing in. Fig. 7 is a similar view with the fresh sheet seized by the grippers 6 and the form 1 moving to give the impression. Fig. 8 shows the first impression as partially given and the advancing end of the sheet as being dropped by the grippers 6 and taken by the grippers 15. Fig. 9 shows the sheet as around the reversing-cylinder at the end of the printing operation. Fig. 10 shows the sheet as nearly in position to be taken by the grippers 18 at the end of the movement of the bed. Fig. 11 represents the sheet as grasped by the grippers 18 and the bed moving the other way to give the second impression. Fig. 12 represents the sheet as having received half of the second impression and as being trans-

ferred from the grippers 18 of the impression-cylinder C to the grippers *o* of the cylinder L, and Fig. 13 shows the completion of the second impression of the sheet and its transfer

5 to the delivery device.

I have represented an oiling-roller R receiving oil by suitable intermediate rolls from the fountain S, and this roll R keeps the impression-surface of the cylinder C in proper
10 condition to prevent an offset upon the same from the first impression upon the sheet during the time that the second impression is being given upon such sheet. This oiling device is of usual character, and by locating
15 the same above the impression-cylinder the reciprocation of such impression-cylinder C brings the surface thereof against which the paper lies while being printed into contact with such oiling-roller; but the sheet itself is
20 never carried between the oiling-roller and the impression-cylinder, as it is delivered either to the sheet-reversing cylinder or to the cutting and take-up cylinder L before reaching the place where the oil is applied,
25 and the upper part of the impression-cylinder is sufficiently open for applying any overlays upon the same for perfecting the impression.

In the diagrammatic sectional view Fig. 5 I have represented the impression-cylinder C
30 and the sheet-reversing cylinder I provided with the respective grippers, as before described, and in addition a fly-frame T, pivoted at 30 and adapted to receive the sheet after it has been printed upon one side and carry
35 such sheet to the delivery-table U. In this case the belts *f* may be dispensed with, and the grippers 15 must be opened after passing the pulley *g'* in order that the sheet may pass down upon the fly-frame T. By the addition
40 of this fly-frame the capacity of the press is increased, as it can then be conveniently employed for printing a sheet upon one side without either reversing or folding the same, and I have represented in this Fig. 5 a feed-
45 table V to take the place of the sets of belts 12 and 13, so that the sheet may be fed in by hand, and I remark that in cases where it is not desired to introduce into the press the cylinders K and L the gear-wheels *k'*
50 and *l'* and disks *k* and *l* and the pawls may be applied upon the shafts of the reversing-cylinder I and of the gear 24, and the action will be the same as before described in giving motion to the delivering or reversing cylinder I in one direction from the oscillating
55 impression-cylinder C. In this Fig. 5 I have represented the pawls as applied upon the reversing-cylinder I and upon the cylinder K. In this instance the disks and gears can be at
60 the same ends of the respective cylinders without interfering with each other, the connecting-gears between the four cylinders being outside the frame and in a separate vertical plane, as indicated in the plan Fig. 2.
65 It is not necessary to employ the guide-bars *e*, as a belt *f'* may take the place of the belt *f* and pass around pulleys *g*³ *g*⁴ *g*⁵, the pulley

*g*³ being sufficiently near to the impression-cylinder C for the sheet to pass down the belts *f'* to the second set of grippers 18, and
70 when the fly-frame T is employed the pulleys *g'* should be made use of to keep the paper in contact with the reversing-cylinder and cause it to pass down the inclined surface of the fly-frame T.

The folding apparatus may be driven by any suitable gearing, and I also remark that I do not limit myself to any particular character of gearing for giving motion to the cylinders I K L progressively and in the same
80 direction so long as they are moved in harmony in the surface speed of the oscillating impression-cylinder C.

It will be observed that the groups of inking-rollers H and H' are adjacent to the impression-cylinder C and at opposite sides thereof, and the ink-table 9 passes entirely beneath the group H of inking-rollers first in one direction and then in the other, and such table 9 also passes at one end entirely beneath the inking-rollers H', so as to ink them
90 before the forms 1 2 3 4 pass beneath such inking-rollers H', which rollers H' apply a second inking to the forms and equalize the ink previous to the second impression being given
95 by the forms on the sheet, and the ink-table 10 travels entirely beneath the inking-rollers H' first in one direction and then in the other, and also passes beneath the inking-rollers H at one end, so as to apply additional ink to
100 the same in order that upon the return motion such rollers H will apply to the type-forms a second inking and equalizing action previous to the first impression being taken. Hence by this arrangement the inking is rendered
105 uniform, notwithstanding the fact that an impression is taken from the forms each reciprocation in each direction.

The inking device for equalizing the ink upon the tables 9 and 10 at the extreme ends
110 of the movements and for applying additional ink to the same are of the ordinary character employed in presses of this description.

I claim as my invention—

1. The combination, with a reciprocating
115 type-bed and an oscillating impression-cylinder geared together, of two sets of grippers, one at each end of the impressing-surface of said cylinder, a feeding device for supplying sheets of paper to one set of the grippers, a
120 sheet-reversing cylinder and grippers for taking the sheet from the first set of grippers, and ranges of bars or their equivalents for passing the sheet from the grippers of the sheet-reversing cylinder to the second set of
125 grippers upon the impression-cylinder, substantially as set forth.

2. The combination, with a reciprocating bed and an oscillating impression-cylinder geared together, of two sets of grippers upon
130 the impression-cylinder, means for supplying the sheets to one set of grippers, a sheet-reversing cylinder and grippers for receiving the sheet from the first set of grippers after

the first impression, sets of belts or tapes for keeping the sheet in proper contact with the sheet-reversing cylinder, and ranges of bars between which the sheet is guided after delivery from the grippers of the sheet-reversing cylinder to the second set of grippers upon the impression-cylinder, substantially as set forth.

3. The combination, with the reciprocating type-bed and impression-cylinder and connecting-gearing, of a sheet-reversing cylinder receiving the sheet directly from the impression-cylinder, two gears directly in gear with the gears of the impression-cylinder, and pawls acting in opposite directions for giving to the sheet-delivery cylinder a progressive movement in one direction from the oscillating impression-cylinder, substantially as set forth.

4. The combination, with the reciprocating type-bed, impression-cylinder, and the connecting-gearing, of the cutting-cylinders K L, the grippers upon the cylinder L, a folding mechanism, and pins for holding the advancing end of the second sheet adjacent to the line of separation, whereby the first sheet is delivered to the folding mechanism during one revolution of the cylinder L and the second sheet is delivered to the folding mechanism during the subsequent revolution, substantially as specified.

5. The combination, with the cutting-cylinders K L, the grippers o, and the pins s, of the folding mechanism and the bridge-bars r between such folding mechanism and the cutting-cylinder L and mechanism for moving the bridge-bars endwise for receiving one sheet during the first revolution and the second sheet during the subsequent revolution of the cylinder L, substantially as set forth.

6. The combination, with the reciprocating type-bed and the oscillating impression-cylinder, of the cylinders K L for delivering the printed sheet of paper, the gearing for connecting the cylinders K and L together and directly with the impression-cylinder, the loose gears, and pawl connections acting in the opposite direction for giving to the cylinders K L a progressive movement in the same direction from the impression-cylinder as it oscillates, substantially as set forth.

7. The combination, with the oscillating impression-cylinder C and the grippers thereupon, of the reciprocating type-bed and the sheet delivering or reversing cylinder and grippers thereon for receiving the sheet direct from the impression-cylinder and gear-wheels and ratchet connections, substantially as specified, for giving to the sheet delivery or reversing cylinder an intermittent movement in one direction from the oscillating impression-cylinder, substantially as set forth.

8. The combination, with a reciprocating bed and an impression-cylinder geared to and receiving its motion from the reciprocating bed, of two sets of grippers upon the impression-cylinder at opposite ends of the impres-

sion-surface, means for supplying the sheets to one set of grippers, a sheet-reversing cylinder and grippers for receiving the sheet from the first set of grippers after the first impression, and means for guiding the sheet as it is delivered from the reversing-cylinder to the second set of grippers, substantially as set forth.

9. The combination, with a reciprocating bed and one impression-cylinder receiving its motion therefrom and two sets of grippers on such impression-cylinder, of means for supplying the sheet to the impression-cylinder and printing the sheet upon one side, mechanism for reversing the sheet to print the same upon the other side, and a delivery-cylinder and cutting mechanism for separating the sheet into two products after the second impression and as delivered, substantially as set forth.

10. The combination, with a reciprocating type-bed and an impression-cylinder and its grippers, of cutting-cylinders for supplying to the press sheets of double length of one complete printed product, sheet-reversing mechanism for turning the sheet and presenting the advancing end to the grippers upon the impression-cylinder, and a second set of cutting devices for separating the sheet into two similar complete products, substantially as set forth.

11. The combination, with a reciprocating type-bed and an oscillating impression-cylinder and its grippers, of an oiling device acting upon the surface of the impression-cylinder as it oscillates in contact with the same and a sheet-reversing mechanism, substantially as specified, whereby the operative surface of the impression-cylinder is oiled each reciprocation without the sheet coming in contact with the oiling devices, substantially as set forth.

12. The combination, with a reciprocating type-bed and an oscillating impression-cylinder connected to and reciprocating therewith, of a delivery-cylinder receiving the sheet directly from the impression-cylinder and mechanism, substantially as specified, for rotating the delivery-cylinder progressively in one direction, substantially as set forth.

13. The combination, with a reciprocating type-bed and an oscillating impression-cylinder and its grippers, of the cylinder I and its grippers for receiving the sheet from the grippers of the impression-cylinder C after the first impression and mechanism for communicating to the cylinder I a progressive movement in one direction while the impression-cylinder is moving in each direction, substantially as set forth.

14. The combination, with the impression-cylinder and the reciprocating type-bed therewith connected, of inking-tables at the end portions of the type-bed and groups of inking-rollers at each side of and adjacent to the impression-cylinder, the movement given to the type-bed being sufficient to bring each inking-

table into contact with both sets of inking-rollers during the respective reciprocations of the type-bed, substantially as set forth.

15. The combination, with the reciprocating type-bed and an oscillating impression-cylinder therewith connected and the grippers thereon, of automatic cutting and feeding mechanism at one side of the impression-cylinder, a sheet-reversing mechanism at the other side of the impression-cylinder, and a sheet-delivery mechanism at the same side of the impression-cylinder as the sheet-supplying mechanism, and gearing for driving the sheet reversing and delivery cylinders in one direction and in harmony with the oscillations of the impression-cylinder, substantially as set forth.

16. The combination, with a reciprocating type-bed and an oscillating impression-cylinder, its grippers connected therewith, of sheet-supplying mechanism at one side of the impression-cylinder, sheet-reversing mechanism at the other side of the impression-cylinder, a sheet-delivery cylinder at the same side of the impression-cylinder as the sheet-supplying mechanism, and an oiling device applied to the upper surface of the oscillating impression-cylinder and between the reversing and delivery cylinders, substantially as set forth.

17. The combination, with a reciprocating bed and an impression-cylinder receiving its motion from the reciprocating bed, of two sets of grippers upon the impression-cylinder and at the ends of the impression-surface, means for supplying the sheet to one set of grippers, the sheet-reversing cylinder for receiving the sheet from the first set of grippers after the first impression, and ranges of bars to which the sheet is guided during the reversing movement, substantially as set forth.

18. The combination, in a printing-machine, of a reciprocating type-bed, an oscillating impression-cylinder and grippers, a sheet-reversing cylinder and grippers taking the sheet directly from the impression-cylinder, and means for conveying the sheet therefrom to the impression-cylinder for perfecting the same, and a movable sheet-delivery

mechanism adapted to be brought into action to take the sheet directly from the sheet-reversing cylinder after the first impression, substantially as set forth.

19. The combination, with the reciprocating type-bed and impression-cylinder and grippers and connecting-gearing, of a sheet-receiving cylinder and its grippers receiving the sheet directly from the impression-cylinder, two gears directly in gear with the gears upon the impression-cylinder, and pawls acting in opposite directions upon the respective gears, whereby the sheet-delivery cylinder is driven progressively in one direction from the oscillating impression-cylinder, substantially as set forth.

20. The combination, in a printing-press, of the reciprocating type-bed and oscillating impression-cylinder, two sets of grippers upon such impression-cylinder, a sheet-reversing cylinder, and belts for directing the sheet around the sheet-reversing cylinder and presenting the end of the same to the second set of grippers, substantially as set forth.

21. The combination, with the reciprocating type-bed, of an impression-cylinder, two sets of grippers on the same, a reversing-cylinder and gearing for giving to the same a progressive movement in one direction, a feeding-table or belts at the opposite side of the impression-cylinder to the reversing mechanism, and a sheet-delivery mechanism above the impression-cylinder, substantially as set forth.

22. A reciprocating bed and impression-cylinder and two sets of inking-rolls at opposite sides of the impression-cylinder, a sheet-feeding table or belts at one side of the impression-cylinder and over one set of inking-rollers, a sheet-reversing mechanism at the other side of the impression-cylinder and over the other set of inking-rollers, and a sheet-delivery mechanism above the feeding mechanism, substantially as set forth.

Signed by me this 16th day of July, 1890.

WALTER SCOTT.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.