No. 848,064. PATENTED MAR. 26, 1907.

H. STAMM.

PRINTING MACHINE.

APPLICATION FILED OCT. 12, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

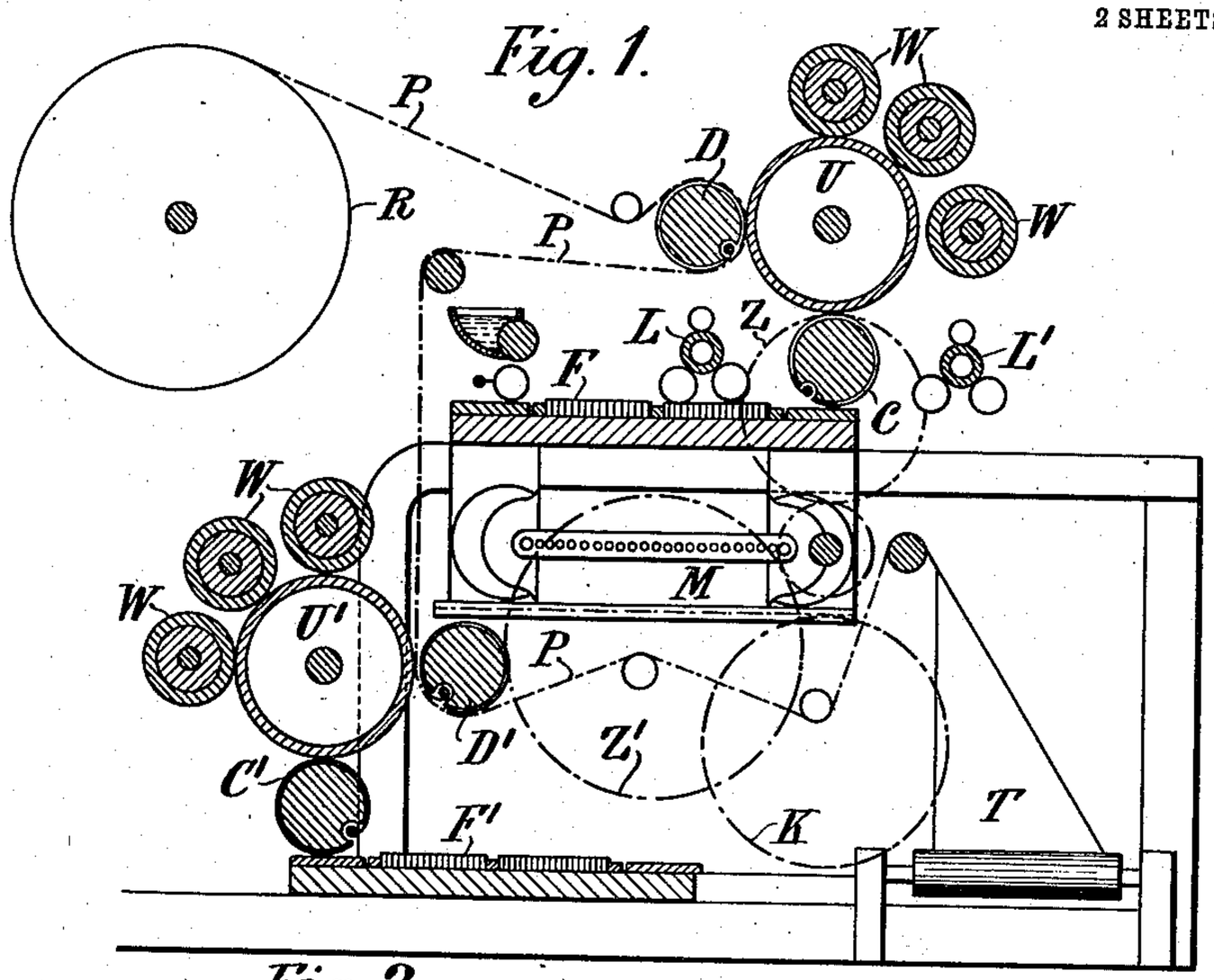
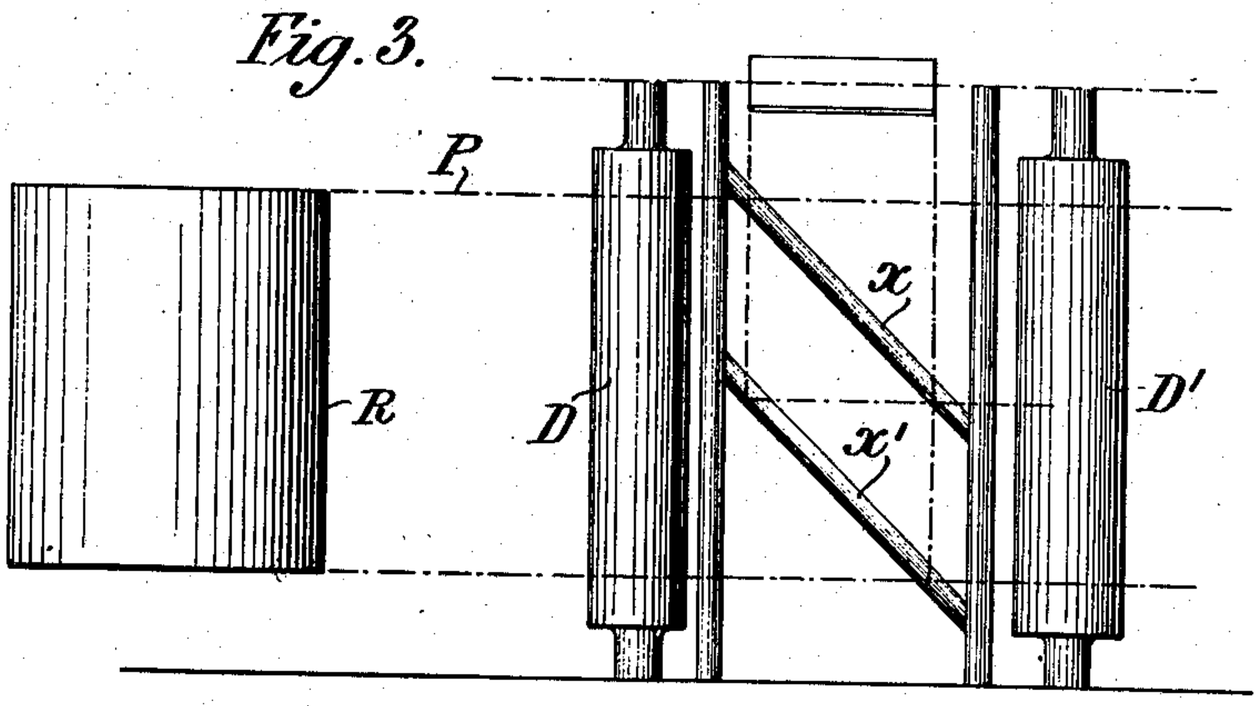


Fig. 2.

Fig. 3.



Witnesses.
M. Lilian Adams.
C. B. Franconi

Inventor.
Henry Stamm,
By his Attorneys
Baldwin & Wight.

No. 848,064. PATENTED MAR. 26, 1907.

H. STAMM.

PRINTING MACHINE.

APPLICATION FILED OCT. 12, 1906.

2 SHEETS—SHEET 2.

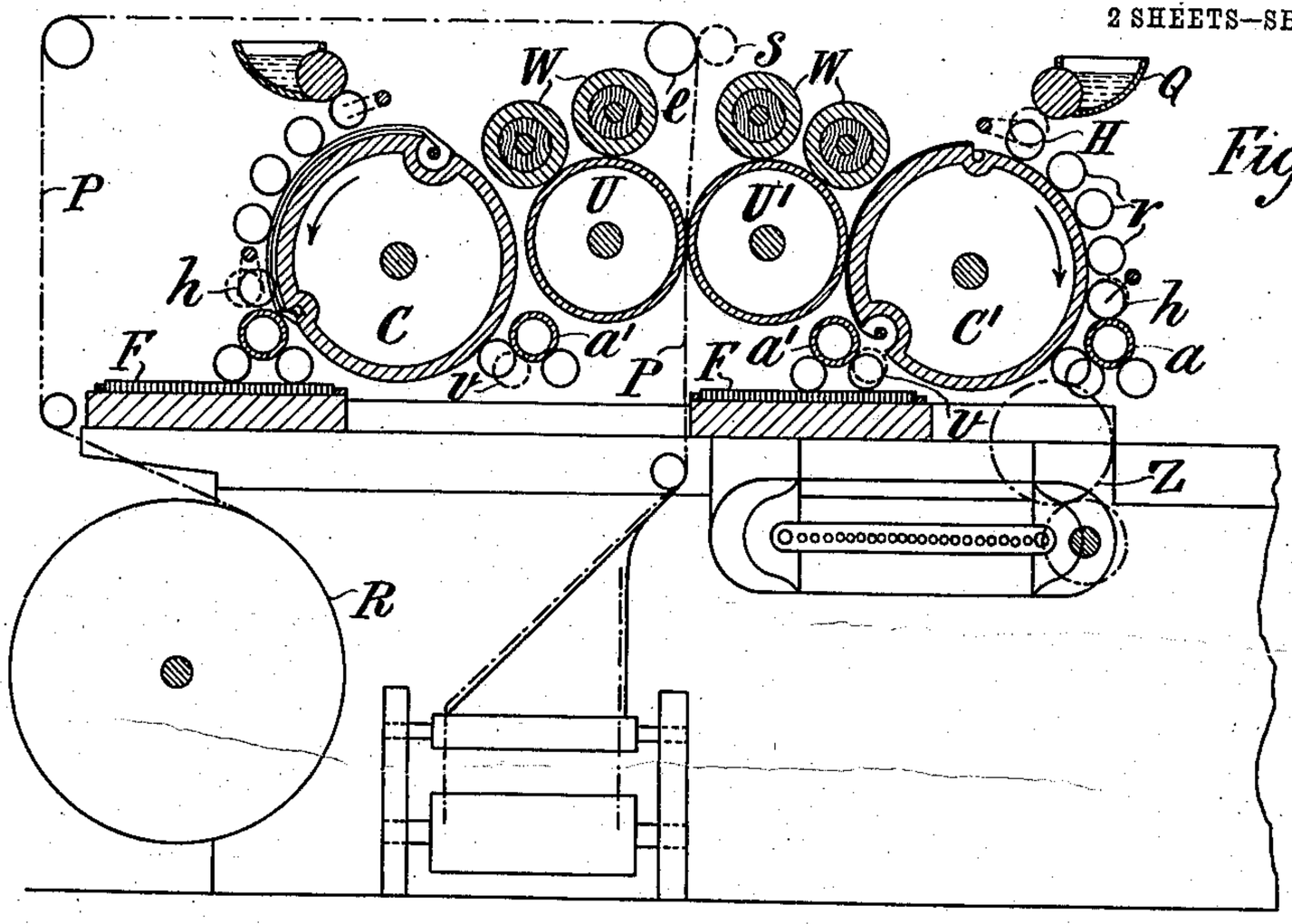


Fig. 5.

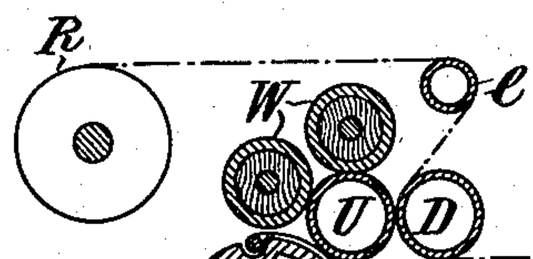


Fig. 4.

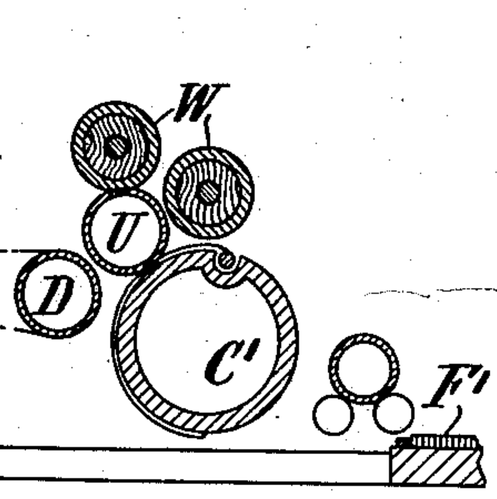
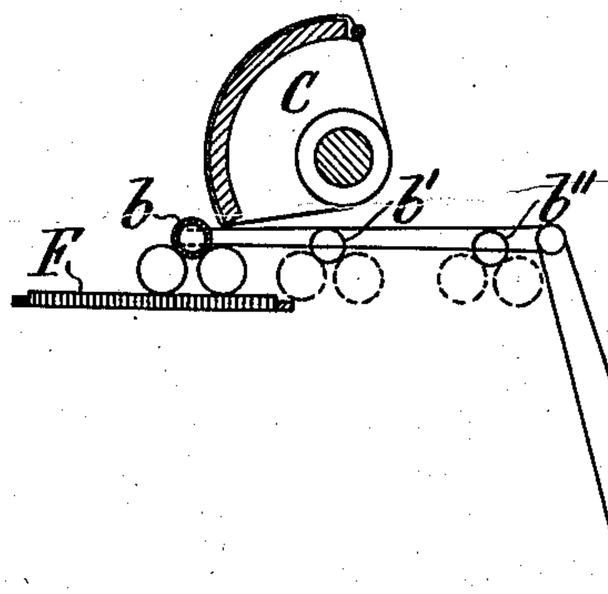


Fig. 6.

Fig. 7.



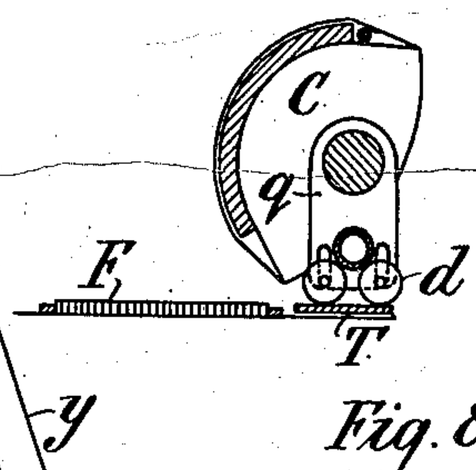
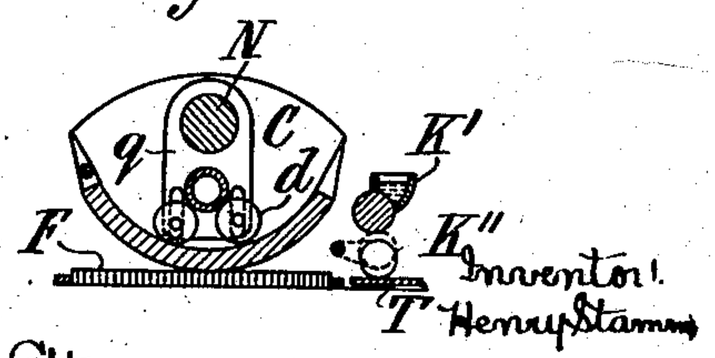


Fig. 8.



Witnesses.
M. Lilian Adams.
C. B. Francone

Inventor:
Henry Stamm

By his Attorneys,
Baldwin & Wright

UNITED STATES PATENT OFFICE.

HENRY STAMM, OF RENTZSCHMUHLE, NEAR JOCKETA, GERMANY, ASSIGNOR TO SCHNELLPRESSENFABRIK ACTIEN-GESELLSCHAFT, OF HEIDELBERG, GERMANY.

PRINTING-MACHINE.

No. 848,064. Specification of Letters Patent. Patented March 26, 1907.

Application filed October 12, 1906. Serial No. 338,663.

To all whom it may concern:

Be it known that I, HENRY STAMM, engineer, a citizen of the Swiss Republic, residing at Rentzschmuhle, near Jocketa, Saxony, Germany, have invented certain new and useful Improvements in Printing-Machines, of which the following is a specification.

The object of this invention is to print on a continuously-traveling endless web of paper from a flat printing-surface; and the invention is equally applicable to printing from type or planographic surfaces. To obtain this result, the paper instead of being brought into direct contact with the printing-surface is printed indirectly through the agency of transfer-cylinders, preferably covered with some elastic material.

In order to enable several prints to be obtained from the same transfer, the transfer-cylinder is brought into contact with one or more auxiliary equalizing-rollers of the same diameter as it or a multiple of it. These auxiliary rollers have an elastic cover of rubber or the like or are of roller composition. They may have a hard surface also if the transfer-cylinder is elastic. They serve to distribute the ink evenly by taking ink from a fresh transfer and delivering it back to a transfer from which one or more prints have been taken.

Figures 1, 2, and 4 are diagrammatic vertical sections showing the application of this invention to flat-bed printing-machines. Fig. 3 is a part plan of Fig. 2. Figs. 5, 6, 7, and 8 are diagrammatic vertical sections of new types of machines.

In the figures, F F′ are flat printing-forms which are reciprocated by any of the means used in ordinary flat-bed machines beneath the transfer-cylinders C and C′, respectively. These cylinders C C′ are rotated continuously in the same direction as in so-called "two-revolution" presses. The cylinders C C′ are covered with elastic material, preferably rubber cloth, and only come into contact with the forms F F′ when the latter are moving in one direction.

V V′ are the printing-cylinders on which the positive impressions on the cylinders C C′ are transferred as negatives. They may have either a hard or an elastic surface.

D D′ are the impression-cylinders round which the endless web of paper P runs from the reel R while it is being printed by the cylinders V V′.

W W are the auxiliary equalizing-cylinders with elastic covers or made of roller composition. They are of the same or a multiple of the diameter of the cylinders V V′, so that the impressions revolve in exact register. As already mentioned, these rollers W W regulate the even intensity of the print. They may be omitted in cases where no great importance is attached to each second, third, &c., print, being of exactly the same intensity as the preceding.

Fig. 1 shows a combination of two flat-bed cylinder-machines placed one above the other. The transfer-cylinder C has a circumference of exactly one sheet length. It turns three times during the to-and-fro movement of the form F. It must therefore be slightly lifted on the return of the form, as is done in the case of two or multi revolution cylinder-machines. The transfer-cylinder C obtains thus a fresh impression on its third rotation. It transfers the impression to the printing-cylinder V, which has a circumference of two sheet lengths or any other even number of sheet lengths. The impressions on the cylinder C are transferred alternately to the two halves of the circumference of the printing-cylinder V, which is thus given an uninterrupted impression, the auxiliary rollers W regulating the evenness of these impressions. The paper comes from the reel R and runs round the impression-cylinder D and is there continuously printed on one side and from thence runs to the printing-machine below, where it is similarly printed on the other side. It then passes, while still endless, to a folding apparatus T of any ordinary construction. Reciprocating motion is given to the form F by a "mangle-gear" M of ordinary construction, the driving-wheel of which has the same diameter as the transfer-cylinder C, and consequently makes three revolutions in each complete cycle of working. Z and Z′ are intermediate wheels by which the upper and lower groups V C D and D′ V′ C′ are respectively driven. K is a wheel by which the lower form is driven from the upper one. Each half of the forms F and F′ is inked by distributing-rolls L and L′.

Fig. 2 shows the application of the invention to another construction of ordinary per-

fecting-machine. The transfer-cylinders C C′ are each of two-sheet-length circumference and are in contact with each other. They make three revolutions for each complete working cycle in which a six-sheet length of paper is printed. The arrangement, therefore, is less advantageous than that shown at Fig. 1. One half of each cylinder is of less diameter than the other half, so that the return of the forms requires no lifting of the cylinders. The action of the printing-cylinders V V′ and the impression-cylinders D and D′ is the same as described before. V and V′, as shown, have a circumference of one sheet length; but they may have a circumference of any odd number of sheet lengths in order to receive a continuous impression from the transfer-cylinder C, which may have a circumference of two or any even number of sheet lengths. A certain difficulty arises in this arrangement in leading away the endless web of paper after it has been printed. In Fig. 2 this is done by means of turning bars $x\,x'$, as often used in ordinary rotary machines. Fig. 3 is a plan showing these turning bars. The paper is printed in double breadth for an eight-paged newspaper, is cut lengthwise after printing by means of circular knives, and the two parts are brought out of the machine sidewise to folding and cutting apparatus of any ordinary kind.

Fig. 4 shows a perfecting-press with the two transfer-cylinders apart from each other. In this case the endless printed paper may be led away direct without the use of turning bars to folding and cutting apparatus below the printing-forms.

Figs. 5, 6, 7, 8 show a special construction of a printing-machine for the application of the present invention. In this case the complete working cycle is equal to three sheet lengths, so that for every three turns an impression is given on the transfer-cylinders C C′. The latter are three sheet lengths in circumference and are of lessened diameter for two thirds of their circumference, the other third being provided with the elastic cover which receives the transfer when the form is moving forward, which occupies one-third of the whole working period. During the passage of the sunk part of the continuously-rotating cylinder the form returns without printing, no lifting of the cylinder being necessary. The raised parts of the transfer-cylinders C C′ carry the transfers to the printing-cylinders V V′. The latter have a circumference of two sheet lengths or any even number of the same, thus getting impressions constantly in the proportion of two to three. This construction allows of the omission of the impression-cylinders D D′, as described in the former arrangements, the endless paper here running direct between the printing-cylinders V V′ and being printed simultaneously on both sides with a single printing. This simultaneous printing of both sides has the advantage of avoiding the set off on the perfecting-cylinder. Thus a very great drawback of all other rotary machines is radically removed. The reciprocating movement of the form is effected in the same way as in Fig. 1 by mangle-gearing with a threefold revolution of the driving-wheel.

In Fig. 5 the form is divided into two parts, as in Fig. 1, the two parts being inked on left and right, respectively, of the transfer-cylinders C C′. The part of the latter which is of less diameter for two-thirds of the circumference serves as a distributing-table for the ink, the latter being carried from the duct Q by a doctor-roller and is spread by distributing-rollers r. Side inclines are provided to lift these rollers $r\,r$ to allow the one-third of the cylinder which is covered with the elastic material and is of larger diameter to pass without touching. By means of the rollers h and v the ink is transferred from the distributing-table of the cylinders C C′ onto the groups of form-rollers a and a'.

Fig. 6 shows another arrangement for the inking of a somewhat similar construction to Fig. 5, with one group of form-rollers instead of two for each form. The transfer-cylinder C in this arrangement is reduced to a segment of one-third of a circle. During the two-thirds of the revolution when the transfer-cylinder does not touch, the form-rollers of group b are moved successively into the positions b' b'' by means of the swinging arm y in order to ink the whole form.

Figs. 7 and 8 show another way of inking an undivided form. In this case the group of form-rollers d always remains in the central position of the transfer-segment, which is, as before, reduced to one-third of a circle, the group d is being lifted to the inside of the transfer-segment while the latter is in contact with the form, so that the distributing-rollers run on the inner surface of the segment, as shown in Fig. 8. The axle N of the segment is stationary, and the bearings of the distributing-rollers are carried by slides which are moved up and down in guides q. The inner surface of the segment C serves as a distributing-table. The ink is supplied from a duct K′, from which it is spread by means of a doctor K″ on the table T, from which it is taken by the distributing-rollers d when in the position shown in Fig. 7.

One of the main features of the present invention is the continuous printing during the whole cycle, and it is applicable not only to endless webs of paper, which are cut after being printed, but also to all sizes of sheets where the paper is cut before printing. For this purpose the construction shown at Fig. 5 is specially adapted where the printing and perfecting cylinders V V′ come in direct con-

tact, and by means of a pair of cutting-cylinders *e* and *s* the sheets may be cut before printing and run direct between the two cylinders V V′, one of them being provided with the usual means for taking hold of the sheets, such as grippers or points. As the two sides of the paper are printed simultaneously by this construction, the feeding of sheets of variable size is far easier than in the heretofore-known rotary machines for all sizes, as no transfer of the paper from one cylinder to the other is necessary.

If positive types or printing-surfaces instead of negative ones are employed, one set of transfer-cylinders may be omitted, the print being effected on paper conducted directly between the cylinders C C′.

What I claim is—

1. The combination of a reciprocating flat form, a continuously-revolving transfer-cylinder which is in contact with the form when the latter is moving in one but not in the other direction, a printing-cylinder revolving in contact with the transfer-cylinder, and an impression-cylinder revolving in close proximity to the printing-cylinder and adapted to press the paper into contact with it.

2. The combination of a pair of reciprocating flat forms, a pair of continuously-revolving transfer-cylinders each in contact with one of the forms when the latter is moving in one but not in the other direction, and a pair of printing-cylinders revolving in contact with each other and each in contact with one of the transfer-cylinders.

3. The combination of a pair of reciprocating flat forms, a pair of continuously-revolving transfer-cylinders each in contact with one of the forms when the latter is moving in one but not in the other direction, a pair of printing-cylinders revolving in contact with each other and each in contact with one of the transfer-cylinders, and equalizing-rollers revolving in contact with the printing-cylinders.

4. The combination of a reciprocating flat form, a revolving transfer-cylinder, part of the periphery of which comes into contact with the form, means for supplying ink to part of the surface of the cylinder, distributing-rollers spreading the ink on the surface, and means for transferring the ink from the surface to the form.

5. The combination of a pair of reciprocating flat forms, a pair of continuously-revolving transfer-cylinders each in contact with one of the forms when the latter is moving in one but not in the other direction, a pair of printing-cylinders revolving in contact with each other and each in contact with one of the transfer-cylinders, means for supplying ink to part of the surface of the transfer-cylinders, distributing-rollers spreading the ink on the surfaces, and means for transferring the ink from the surfaces to the forms.

6. The combination of a pair of reciprocating flat forms, a pair of continuously-revolving transfer-cylinders each in contact with one of the forms when the latter is moving in one but not in the other direction, a pair of printing-cylinders revolving in contact with each other and each in contact with one of the transfer-cylinders, equalizing-rollers revolving in contact with the printing-cylinders, means for supplying ink to part of the surface of the transfer-cylinders, distributing-rollers spreading the ink on the surfaces, and means for transferring the ink from the surfaces to the forms.

7. The combination of a reciprocating flat form, a continuously-revolving cylinder part of its periphery being of greater diameter than the remainder and having a surface adapted for receiving transfers such surface coming into contact with the form when the latter is moving in one but not in the other direction, a continuously-rotating printing-cylinder intermittently in contact with the said surface, means for supplying ink to the surface of part of the first cylinder which is of less diameter than the transfer-surface, distributing-rollers spreading the ink on the surface, and means for transferring the ink from it to the form.

8. The combination of a reciprocating flat form, a continuously-revolving cylinder part of its periphery being of greater diameter than the remainder and having a surface adapted for receiving transfers such surface coming into contact with the form when the latter is moving in one but not in the other direction, a continuously-rotating printing-cylinder intermittently in contact with the said surface, means for supplying ink to the surface of part of the first cylinder which is of less diameter than the transfer-surface, distributing-rollers spreading the ink on the surface, means for transferring the ink from it to the form, and an equalizing-roller revolving in contact with the printing-cylinder.

9. The combination of a pair of reciprocating flat forms, a pair of continuously-revolving cylinders, part of their periphery being of greater diameter than the remainder and having a surface adapted for receiving transfers such surface coming into contact with one of the forms when the latter is moving in one but not in the other direction, continuously-rotating printing-cylinders in contact with each other and intermittently in contact with the transfer-surfaces, means for supplying ink to parts of the surfaces of the first cylinders which are of less diameter than the transfer-surfaces, distributing-rollers spreading the ink on these surfaces, and means for transferring the ink from them to the forms.

10. The combination of a pair of reciprocating flat forms, a pair of continuously-revolving cylinders, part of their periphery being of greater diameter than the remainder

and having a surface adapted for receiving transfers such surface coming into contact with one of the forms when the latter is moving in one but not in the other direction, continuously-rotating printing-cylinders in contact with each other and intermittently in contact with the transfer-surfaces, means for supplying ink to parts of the surfaces of the first cylinders which are of less diameter than the transfer-surfaces, distributing-rollers spreading the ink on these surfaces, means for transferring the ink from them to the forms, and equalizing-rollers revolving in contact with the printing-cylinders.

HENRY STAMM.

Witnesses:
GEORG RICHTER,
ROBERT B. RANSFORD.