

(No Model.)

2 Sheets—Sheet 1.

W. H. R. TOYE.
PRINTING PRESS.

No. 533,186.

Patented Jan. 29, 1895.

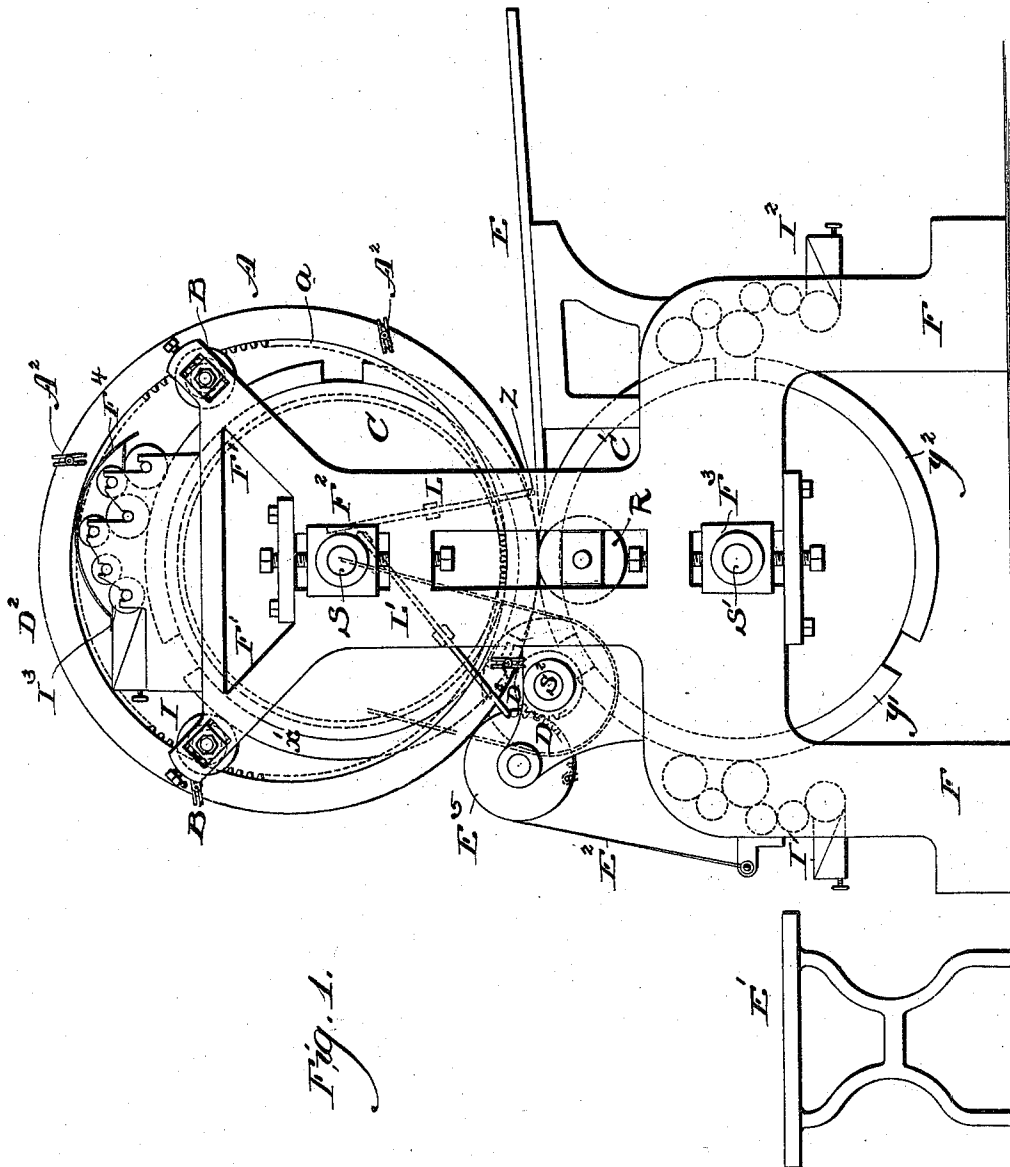


Fig. 1.

WITNESSES:

Ralph B. Williams
Edward F. Ayres

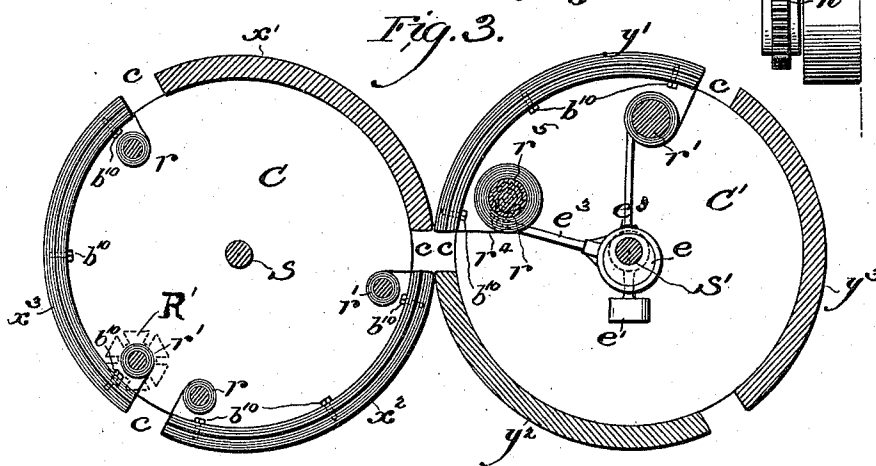
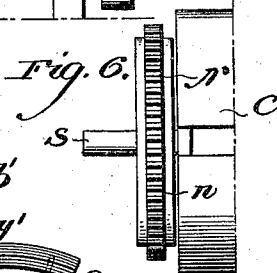
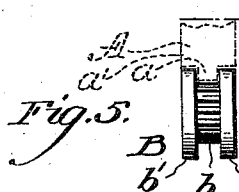
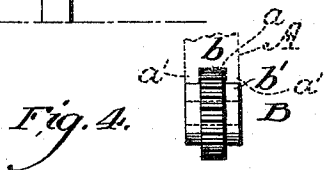
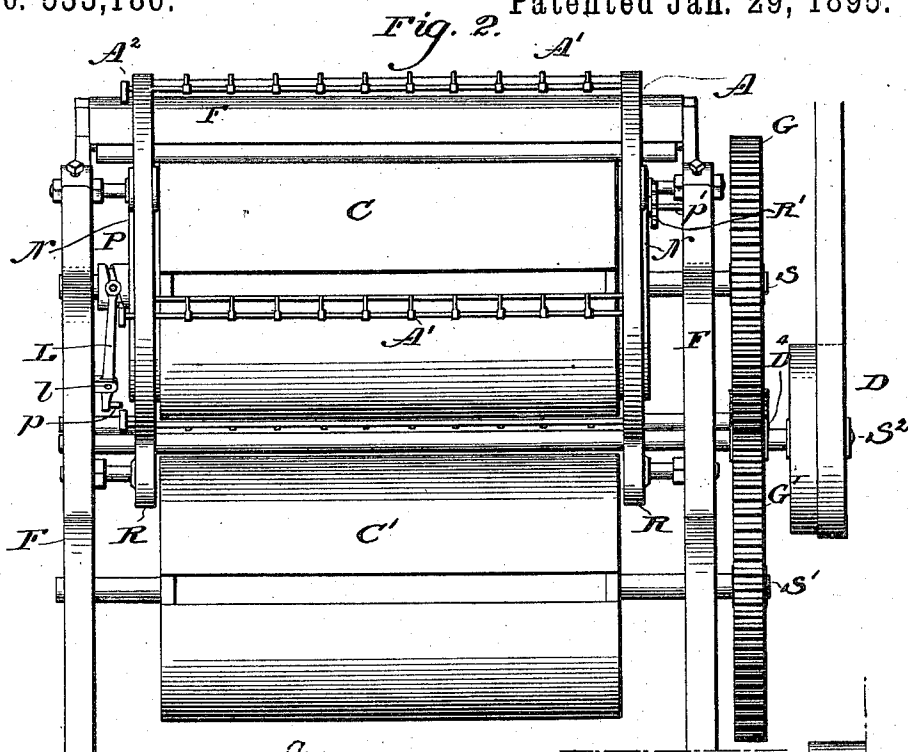
INVENTOR:

William H. R. Toye
by his atty.
Francis J. Chambers

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WITNESSES:
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UNITED STATES PATENT OFFICE.

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

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 533,186, dated January 29, 1895.

Application filed May 29, 1893. Serial No. 475,846. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. R. TOYE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain useful Improvement in 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 machines and has for its object the production of a printing press which will print a blank on both sides in more than one color from one pair of cylinders without the necessity of releasing the sheet from the grippers which seized it at the feed board.

To this end my invention consists in providing each of a pair of cylinders with type and platen surfaces and arranging a suitable carrier for conveying the blanks to be printed between the cylinders and also in certain details of construction which will be pointed out more specifically in the claims appended to and forming a part of this specification.

My invention is best described in connection with the drawings in which it is illustrated, and in which—

Figure 1 is a side view of a printing press embodying my invention. Fig. 2 is a front elevation of the press shown in Fig. 1. Fig. 3 is a sectional view of the cylinders removed from the rest of the machine to show their general mode of construction. Figs. 4 and 5 are detail views of the toothed supporting wheels for the carrier, and Fig. 6 is a view of the driving gear for the carrying mechanism.

F is the frame of the machine in which are arranged vertically adjustable journals $F^2 F^3$ for shafts $S S'$. On the shaft S is arranged a cylinder C , a driving gear G , two gear wheels N and a cam P ; and on the shaft S' a cylinder C' of the same size as the cylinder C , and a driving gear G' . The frame F is provided, in the construction shown, with arms F' in which are adjustably supported small idle wheels B preferably in such manner that they can be adjusted. These idle wheels B may be provided with teeth b which gear with the internal teeth a on the carrier so as to prevent any slip between it and the supporting wheels B , and these wheels may also be provided with flanges b' which bear against the

flange or flanges a' on the carrier. The teeth compel the supporting wheels to rotate, and so prevent them from wearing flat. The carrier A is preferably arranged with "inset" gear teeth, in which case the wheel B arranged as shown in Fig. 4, would be used. It is obvious however that the construction shown in Fig. 5 could be used if the gear teeth were not to be inset. A wheel R may also be provided beneath the carrier to further support it as shown in Fig. 2.

The carrier A in the construction shown consists of a hubless rim provided with a number of gripper mechanisms A' which are provided with tumbler cams A^2 in a usual way, a lever L' pivoted at l and operated by the cam P being arranged to tumble the cams A^2 by means of a pin p to release the printed sheet, and a lever L , shown in dotted lines in Fig. 1, being adapted to actuate the grippers to seize a sheet from the feed board in a well known manner.

The cylinders $C C'$ are each divided into a number of sections $x' y'$, &c., which are arranged with spaces between them for the accommodation of the gripper bars. There may obviously be any number of sections but in the drawings I have shown each cylinder with three sections and the carrier A with four sets of gripper mechanisms, the distance between each set corresponding to the length of a section $x' y'$, &c. The section x' as shown is arranged to receive type or other impression plate, the corresponding section y' on the cylinder C' being adapted to carry a removable platen turtle. The sections $y^2 y^3$ are shown arranged for type or impression plates and the sections $x^2 x^3$ arranged to serve as platen surfaces.

Inking rolls $I' I^2 I^3$ actuated in any suitable manner, the fountains of which are filled with different colored inks if desired, serve to ink the types at proper times, the rolls $I' I^2$ being set in the frame F of the press and the rolls I^3 in a support I arranged between the arms F' . To keep a clean surface on the platens I arrange a system of set off by which a web of paper, cloth, or other suitable substance is wound around automatically by the action of the machine. There are obviously many ways of doing this. In Fig. 3 two rolls $r r'$ are shown pivoted in the cylinder C' on which is a roll

of paper or other suitable material r^4 . A star wheel R' is arranged on the end of one of the rolls and a pin p' is arranged to turn the star wheel a portion of the way around on each revolution of the cylinder C and so to wind up the paper roll r^4 . An eccentric e loosely journaled on shaft S' and kept in a definite position by a weight e' may also be used to reciprocate an arm e^3 and turn the roll r by means of ratchet teeth r^5 with which the end of the arm engages; guides as e^4 serving to guide the arm e^3 .

In operation suitably colored inks being put in the wells of the inking mechanisms I' I^2 I^3 , a blank is fed from the feed board and is seized by the grippers at the point Z and carried between the cylinders C C' . Supposing that the sections x' y' are the sections acting, the blank will be printed on the upper side by means of the types on the section x' which are inked by the rolls I^3 . The sheet being carried around by means of the carrier A and because the said carrier is longer than the cylinders C C' (in the case shown in the ratio of four to three) the sheet will be delayed in going around and will next be presented to the types on section y^3 which are inked from the rolls I^2 this printing being on the under side. The next revolution of the carrier will bring the blank so that it will be printed again on the under side by the types y^2 which are inked from the rolls I^3 , and then the completely printed blank will be seized by grippers on a delivery drum E^5 and will be placed by fly fingers E^2 on the receiving board E' .

The other grippers on the carrier A , also, of course, carry around sheets at the same time; there being normally, when the machine is in operation, three sheets on the carrier, and one sheet is released and one seized at every revolution of the cylinder C . The cam P therefore, which revolves with said cylinder C serves to operate the pins to tumble the grippers at the proper time. It will, of course, be noted that each sheet in the press shown will be printed once on the upper and twice on the under side and also that as a new sheet is seized on each full revolution of the cylinder C this cylinder will be in the same relative position when each sheet is seized, and each sheet will be first acted on by the same set of types.

I have shown the whole machine driven from pulleys D which drives a shaft S^2 carrying a gear wheel D^4 which meshes with the driving gear G' which in turn meshes with the gear G but any other convenient mode of driving the press can obviously be adopted. The carrier has been shown as consisting of hubless rims A A' of greater length than the circumference of the cylinder C supported by the wheels B and preferably also by vertically adjustable wheel R as best shown in Fig. 2 and driven by the gear wheels N whose teeth n mesh with the teeth a on the carrier A , and this is the construction preferred but a band of metal such as is described in United

States Patent No. 364,976, granted to me June 14, 1887 can be substituted for the hubless rim carrier or a rack composed of links pivoted or otherwise secured together as shown in my pending applications, Serial Nos. 469,814 and 469,682, filed April 10, 1893. It is also evident that any other preferred means may be used instead of the drum E^5 for carrying away the printed sheets, this forming no part of my invention, and that the lever as L' or other suitable means can be arranged to move the pins which govern the gripper mechanism. The platen surfaces formed by the web of paper or cloth rolled on the rods r r' , &c., are stretched over removable platen turtles so that the turtles can be removed and made up away from the press for the sake of convenience. These turtles are shown secured to the cylinders by bolts as b^{10} but any other means of securing the turtles to the cylinders can obviously be adopted.

The inking rolls can be raised and lowered by any convenient means; a cam or other suitable device, well known in the art, being obviously capable of raising and lowering the inking rolls at proper times. A fender F^4 is preferably arranged over the inking rolls I^3 to prevent the sheets when carried by the carrying device from falling on and being soiled by these rolls. It will also be noted that by arranging the cylinders which constitute the printing couple, one above the other, and the carrier device with its center substantially on the line of the centers of the cylinders, that a very compact press is obtained.

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

1. In a printing machine the combination with a cylinder divided into a number of sections, certain of which are adapted to carry types and the rest impression surfaces, of a second cylinder divided into an equal number of sections those corresponding to the sections carrying types on the first cylinder being provided with impression surfaces, and those corresponding to the sections provided with impression surfaces in the first cylinder being adapted to carry types, and a carrier adapted to convey a sheet to be printed between the cylinders as many times as there are sections in the cylinders whereby the sheet may be printed in two or more colors on one or both sides.

2. In a printing machine the combination with a cylinder divided into a number of sections, some of which are adapted to be provided with impression surfaces, and some with types, of a second cylinder divided into the same number of sections, certain of which are adapted to be provided with types corresponding to the impression surfaces on the first cylinder and the rest of the sections with impression surfaces corresponding to the types of the first cylinder, and a carrier of greater length than the circumference of the

cylinders and having one more set of gripper mechanisms than the number of the sections on the cylinders.

3. In a printing press, the combination with
5 two cylinders each of which is divided into an equal number of sections, of a hubless rim adapted to serve as a carrier and having one more set of gripper mechanisms than the number of sections on the cylinders, supports for
10 said hubless carrier, and means for adjusting said supports so as to change the line of travel of the carrier relative to that of the cylinders.

4. The combination with a printing couple
15 consisting of two cylinders each of which is divided into an equal number of sections, of an internally toothed hubless rim serving as a carrier for conveying sheets to be printed between the cylinders, gripper mechanisms
20 on said carrier, supports therefor and a gear adapted to rotate with one of the cylinders and mesh with the internal teeth on said carrier and drive it with the same surface speed as the cylinders.

5. The combination with a printing couple
25 consisting of two cylinders each of which is divided into an equal number of sections, of an internally toothed rim having gripper mechanisms one more in number than the number of sections on the cylinders, supports
30 for the rim and a gear moving with one of the cylinders and adapted to engage with the internal gear and drive the carrier.

6. The combination with a hubless wheel
35 having internal gear teeth and serving as a carrier device, of supports for said carrier consisting of idle wheels inside the carrier arranged with teeth to gear with the teeth on

the carrier and a support as a wheel beneath the carrier substantially as described. 40

7. In a printing machine the combination with a cylinder forming one member of a printing couple, of a carrier of greater length than the circumference of the cylinder and adapted to convey the sheets to be printed
45 between the members of the printing couple, inking mechanism arranged within the path of travel of the carrier, and a fender F^4 adapted to prevent the sheets carried by the carrier from striking the rolls. 50

8. In a printing press the combination with two cylinders arranged, one above the other and constituting a printing couple, each of said cylinders being divided into an equal number of sections, of a gear N secured to
55 the shaft of one of the cylinders, a hubless carrier having one more set of gripper mechanisms than the number of sections on the cylinders, supports for said carrier and internal gear a adapted to mesh with the gear
60 N whereby the carrier is driven.

9. The combination with a printing couple, each member of which is divided into a corresponding number of sections, certain of which are provided with impression surfaces
65 and others with types, of a carrier of greater length than the sum of the lengths of the sections on one member of the printing couple, gripper mechanisms on said carrier, and a number of inking rolls, certain of which are
70 within the line of travel of the carrier.

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Witnesses:

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