

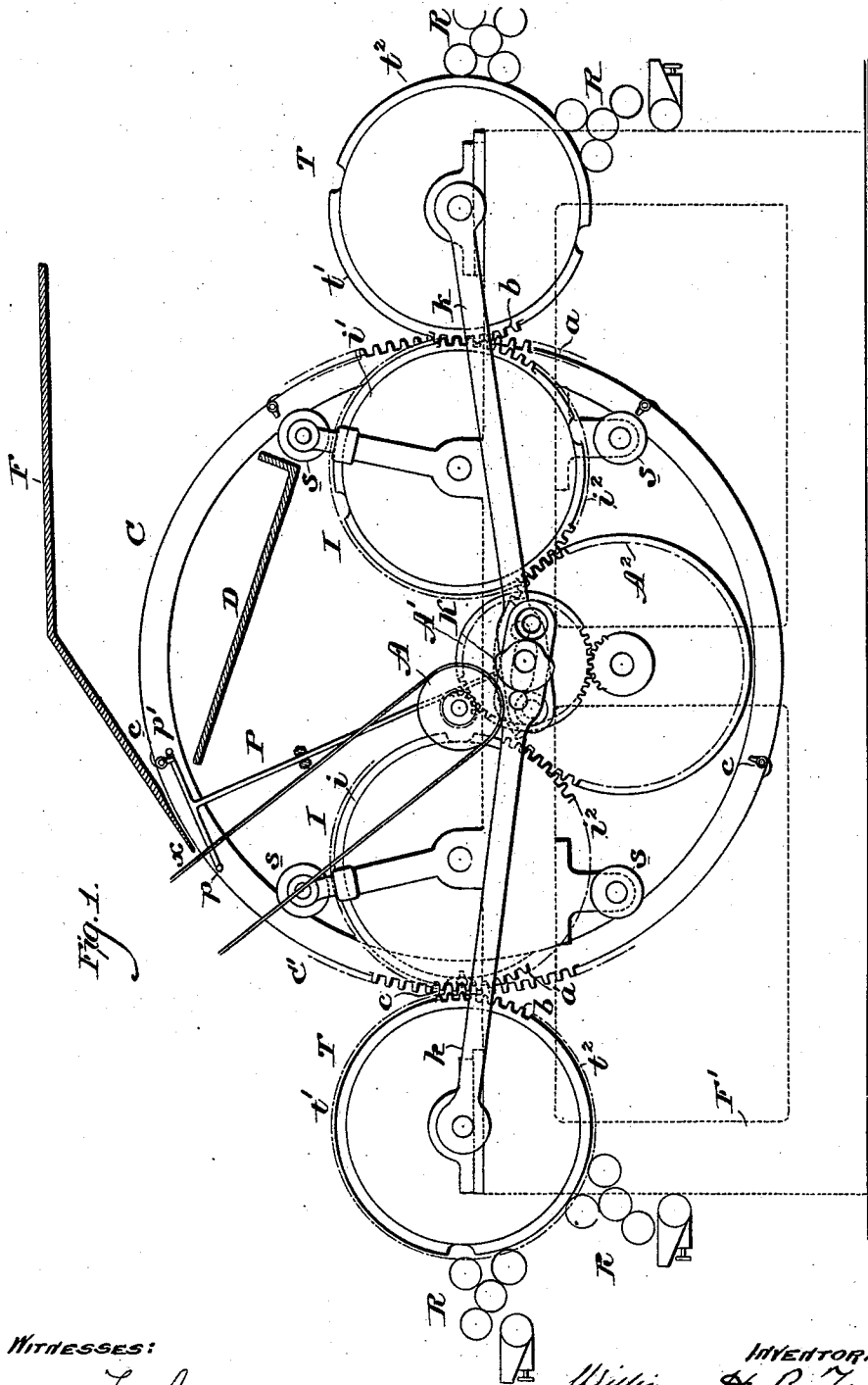
(No Model.)

2 Sheets—Sheet 1.

W. H. R. TOYE.
PRINTING MACHINE.

No. 538,852.

Patented May 7, 1895.



WITNESSES:

Edw. F. Ayres.
David S. Williams.

INVENTOR:

William H. R. Toye
by his attys.
James T. Chambers

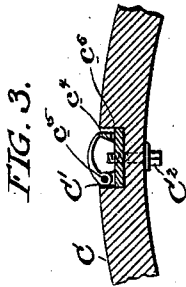
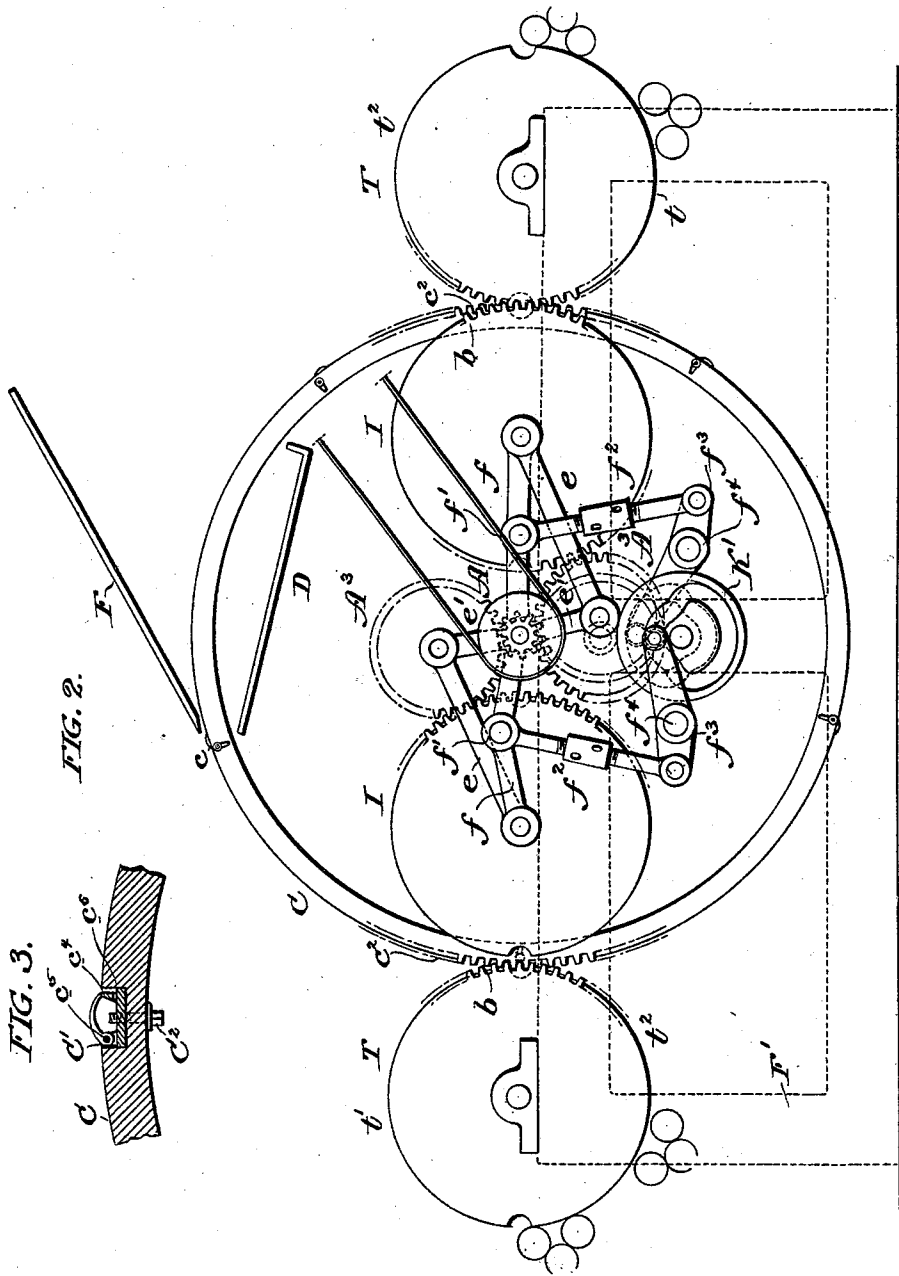
(No Model.)

2 Sheets—Sheet 2.

W. H. R. TOYE.
PRINTING MACHINE.

No. 538,852.

Patented May 7, 1895.



WITNESSES:

Edw. F. Ayres

David S. Williams

INVENTOR:

William H. R. Taylor
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Francis T. Chambers

UNITED STATES PATENT OFFICE.

WILLIAM H. R. TOYE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF, ROBERT P. BROWN, AND EDWARD L. BAILEY, OF SAME PLACE.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 538,852, dated May 7, 1895.

Application filed June 1, 1894. Serial No. 513,142. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. R. TOYE, a citizen of the United States, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Printing-Machines, 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 particularly to such as are designed to print in colors, and will be best understood as explained in connection with the accompanying drawings, in which—

Figure 1 is a side view, conventionalized, of a printing machine constructed according to my invention. Fig. 2 is a similar view to that shown in Fig. 1, illustrating a somewhat modified construction; and Fig. 3 is a view of a detail.

F' is a suitable frame, shown in dotted lines, on which are supported two or more printing couples (two being shown) each consisting of an impression cylinder I and a type cylinder T. These cylinders are shown each divided into two corresponding sections i' , i'' , t' , t'' , &c.

R are inking rolls, a set being provided for each section.

C is the carrier for conveying sheets between the printing couples, and it consists of a hubless wheel or rim, and has one more set of gripper mechanisms c than there are sections on the impression cylinders, and as the distance between each set of grippers is the same as the breadth of a section, the length of the carrier is greater by the breadth of one section than the sum of the breadths of the sections, thus forming an alternating carrier, that is, one which will retard the sheet and so present it to a different set of types at every revolution. In the construction shown, the length of the carrier is five times the breadth of a section i' or t' , there being four of these corresponding type and packing sections. Suitable means are provided for separating the cylinders at intervals so that the sheet can be carried between them without receiving an impression so as to permit of double rolling of the type surfaces, and also so that the sheets may always be printed on in the same order, a matter of great consequence in color printing.

In Fig. 1, A is the drive shaft, connected through suitable gears A' , A'' to the impression cylinders I I. On the shaft of the gear A' are cams K. k , k are links operated by the cams K, in a well-known manner, to move away the type cylinders and separate the printing couples at regular intervals. In this construction the inking rolls R are supported in a well-known manner on a frame connected to the journal boxes of the type cylinder, and are moved toward and from this cylinder by means of cams on the cylinder shaft. This is a well-known construction, and I have not deemed it necessary to illustrate it specifically.

In Fig. 2, I have shown a modified construction wherein the type cylinders are stationary and the impression cylinders movable. Here the power of the drive shaft A is communicated to the cylinders I I through gears A'' , which are pivoted on boxes, so connected by links to the axes of the drive shaft and the cylinders I I, that they will always be in engagement with both. K' , K' are cams, similar to the cams K in Fig. 1, and serve, through the medium of levers f'' , pivoted at f'' , and links f'' , pivoted at f'' to the toggle links f , to move the impression cylinders I I into and out of contact with the type cylinders. The particular connections by which the couples are separated are old, and I simply illustrate them to show that it is possible to make either the type or the impression cylinder movable away from its coacting cylinder. I prefer, however, the construction shown in Fig. 1. The rimless wheel is supported on small rolls, as s , s , which I preferably make adjustable, as shown.

In the construction illustrated in Fig. 1, I provide the carrier with external gear teeth c' which mesh with teeth b' on the cylinders T T, and the carrier is driven thereby. Gear teeth on the cylinders T T mesh with the teeth a on the impression cylinders and receive their motion therefrom. The intermeshing gear teeth are of such size that they will never entirely draw out of mesh when the couples are separated as is usual. However, as one of the type cylinders T is always in close engagement with the carrier, and its coacting cylinder I, there will be no danger of any lost motion.

In Fig. 2 the arrangement is substantially

the same, except that the impression cylinders move, instead of the type cylinders. Their gear teeth, however, do not draw out of mesh, and one printing couple is always engaged 5 and power directly transmitted. In order to make perfect register in case the carrier C should expand, as on account of heat, I prefer to make the gripper mechanism radially adjustable.

10 In Fig. 3 the gripper rod c^4 and the shaft c^5 of the grippers themselves are mounted in a block C' . This block is guided radially in slots in the rim or wheel C, and means, as a screw C^2 , arranged substantially as shown enables 15 the operator to adjust the block in its guides or slots c^2 . I also prefer to arrange the delivery board D, within the path of travel of the carrier, so as to save valuable space.

F is the free board, and I have indicated at 20 P Fig. 1 a lever provided with pins pp' which are adapted to trip the grippers at proper times to seize and release a sheet in the usual way, the pin p being in position to operate the grippers to seize and the pin p' in position to 25 operate the grippers to release a sheet. This lever P is properly operated by a cam (not shown) on the shaft of gear wheel A' in the usual manner to throw it into and out of operation.

30 While I have shown my printing machine composed of two printing couples, the cylinders of which are each divided into sections, it will, of course, be evident that there may be three or more printing couples instead of 35 two, as shown, and also that each cylinder may be divided into more than two sections, or, if desired, each cylinder may be adapted to print in but one color, being composed of but one section. In all these cases, however, 40 the carrier will have one more set of gripper mechanisms than the whole number of type sections, and the printing couples will be separated at suitable intervals, so that the sheet will receive but one impression at each revolution 45 of the carrier.

In operation, a sheet is seized at the point x and is carried around by the carrier till it is fully printed; being presented to a different type section at each revolution of the carrier. Each different type section may print 50 on it in a different color. The sheet is then released and falls on the delivery board, which lies within the path of travel of the carrier.

55 By the arrangement of the feed board shown, much space is saved, and by combining it with a hubless wheel or rim, the printed sheets can be removed from the side of the press when it is in motion. It will also be 60 noted that by my arrangement the type cylinders are in a position where the plates thereon can be easily gotten at, also by separating the sectional cylinders at proper and regular intervals multiple rolling can be effected, thus saving many of the rollers usually employed, and at the same time the col-

ors will always be printed, as has been explained, in the same order.

Having now described my invention, what I claim as new, and desire to secure by Letters 70 Patent, is—

1. The combination with two or more printing couples, consisting of a type and an impression cylinder, each composed of a corresponding section or sections, of a hubless wheel, 75 adapted to serve as a carrier, and having one more set of grippers than the whole number of sections on the impression or type cylinders, the distance between the grippers being equal to the breadth of the type section, 80 whereby the sheet will be presented to a different set of types at each passage between the printing couples, and means for separating the printing couples at intervals to permit the passage of the sheets without receiving an impression, and so that the sheet will 85 receive but one impression at each revolution of the carrier.

2. The combination with two or more printing couples, consisting of a type and an impression cylinder, each divided into corresponding sections, of a hubless wheel of greater length than the breadth of the sections, as described, and serving as an alternating carrier, gripper mechanism on said carrier, means to 90 adjust said gripper mechanisms radially, and means for separating the printing couple at suitable intervals so that a sheet will pass between the printing couple without receiving an impression. 95 100

3. The combination in a printing machine of two or more printing couples, consisting of a type cylinder T and an impression cylinder I, each divided into corresponding sections, a drive shaft suitable cams thereon, links k 105 operated by the cams and connected to the journal boxes of the type cylinders T. T. and adapted to separate the type from the impression cylinder at suitable intervals, a hubless rim serving as a carrier and having one more 110 set of gripper mechanisms than the number of sections on the impression cylinders the distance between the grippers being the same as the breadth of a section whereby a sheet carried by the grippers on said carrier will be 115 presented to a different section on each revolution of the carrier, and means for driving the carrier and the cylinders.

4. The combination in a printing machine of two or more printing couples, consisting of 120 a type and an impression cylinder, each divided into corresponding sections with a hubless wheel of greater length than the breadth of the sections as described and serving as an alternating carrier, and a delivery board 125 within the line of travel of the carrier and so arranged that printed sheets can be removed from it during the operation of the machine.

WILLIAM H. R. TOYE.

Witnesses:

ROBERT W. LLOYD,
EDWARD F. AYRES.