

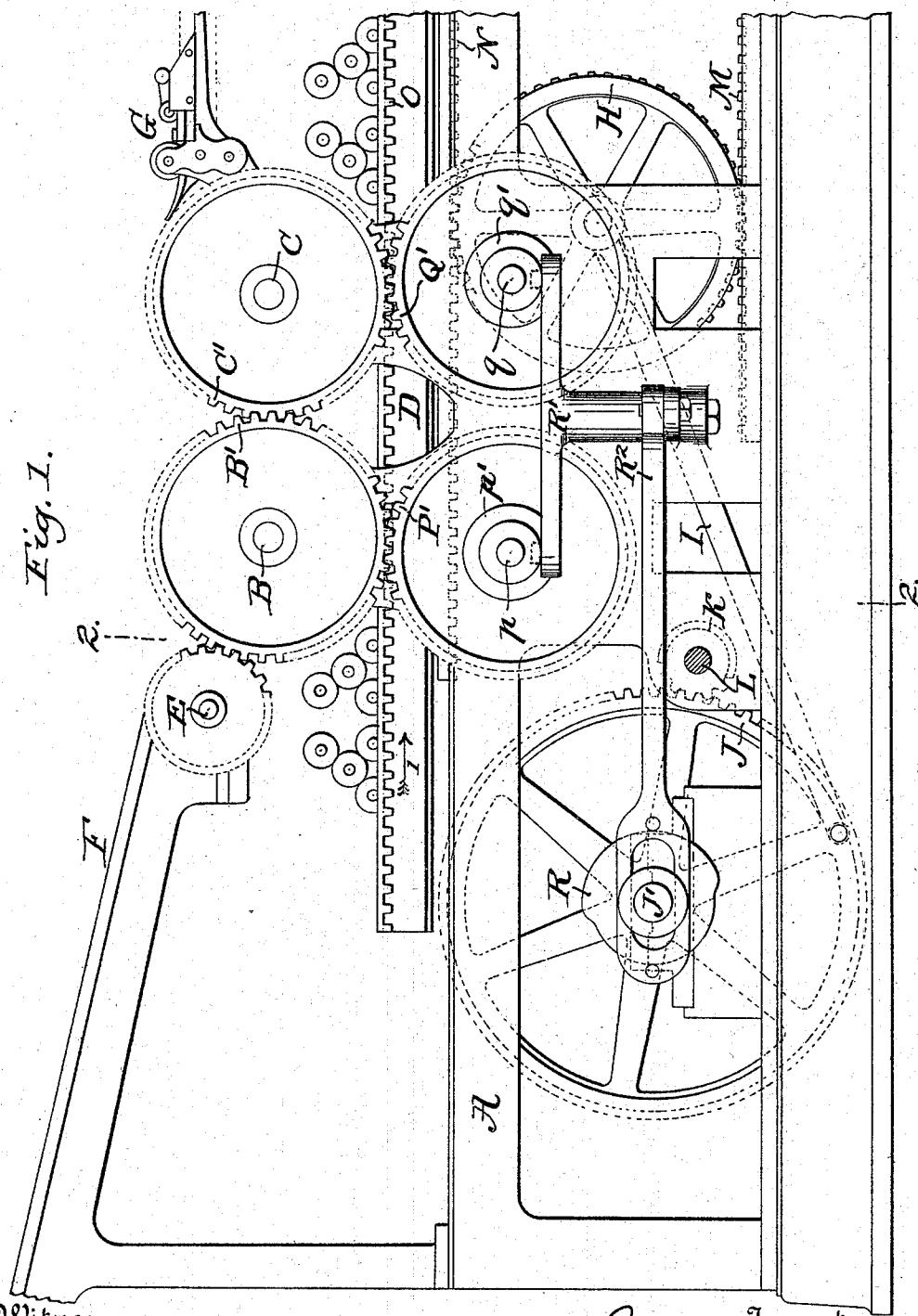
(No Model.)

3 Sheets—Sheet 1.

J. BROOKS.  
CYLINDER PRINTING MACHINE.

No. 527,941.

Patented Oct. 23, 1894.



Witnesses  
H. Graham.  
V. J. Goetz.

John Brooks, Inventor  
By his Attorneys  
Graham & Low

(No Model.)

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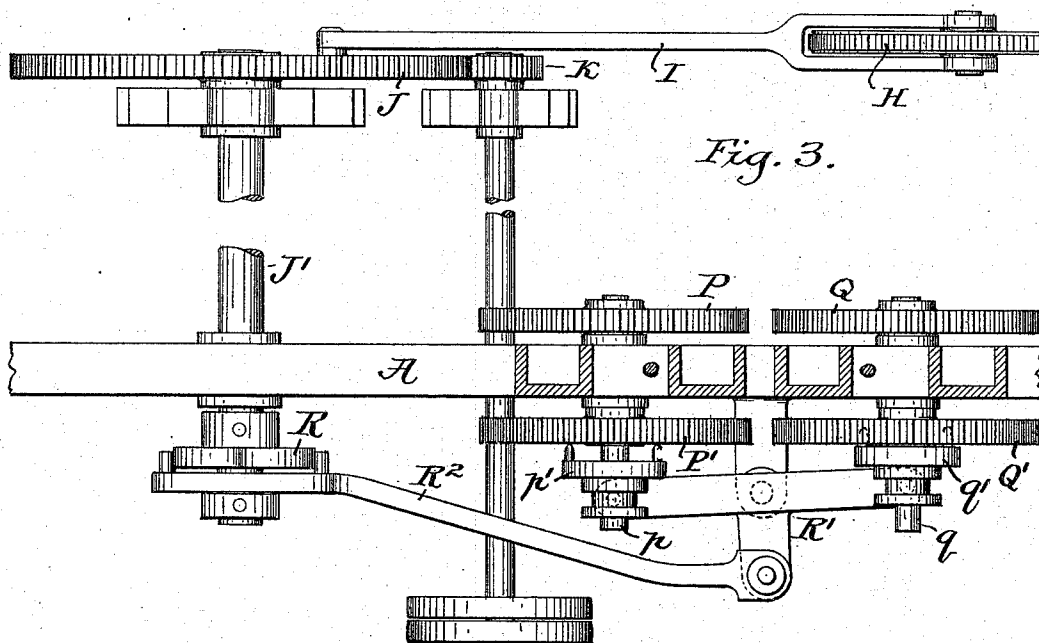


Fig. 3.

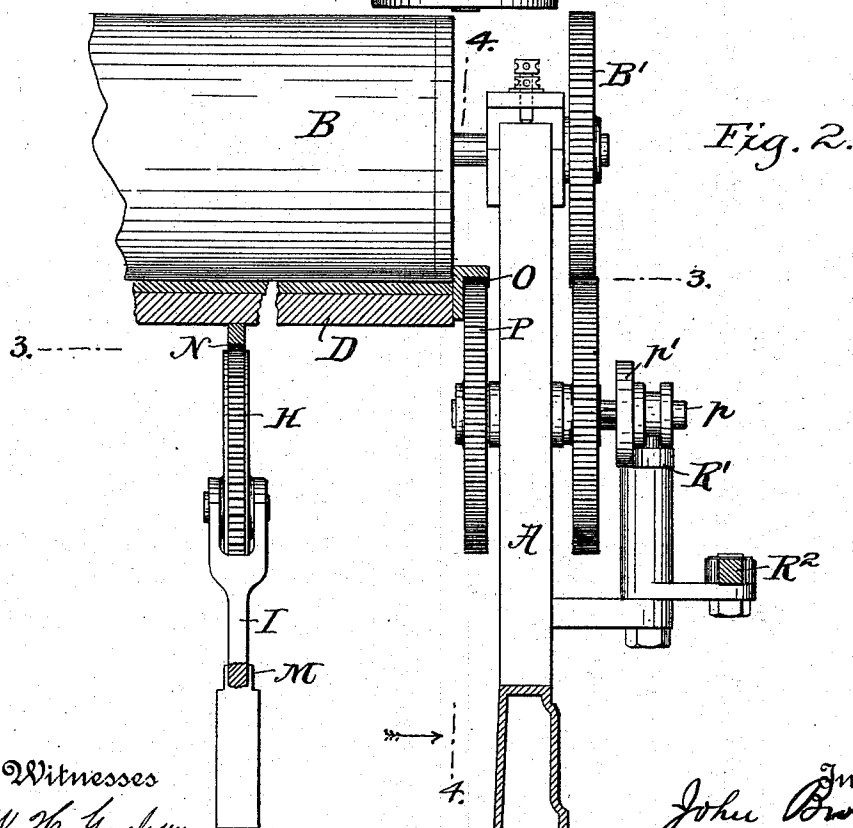


Fig. 2.

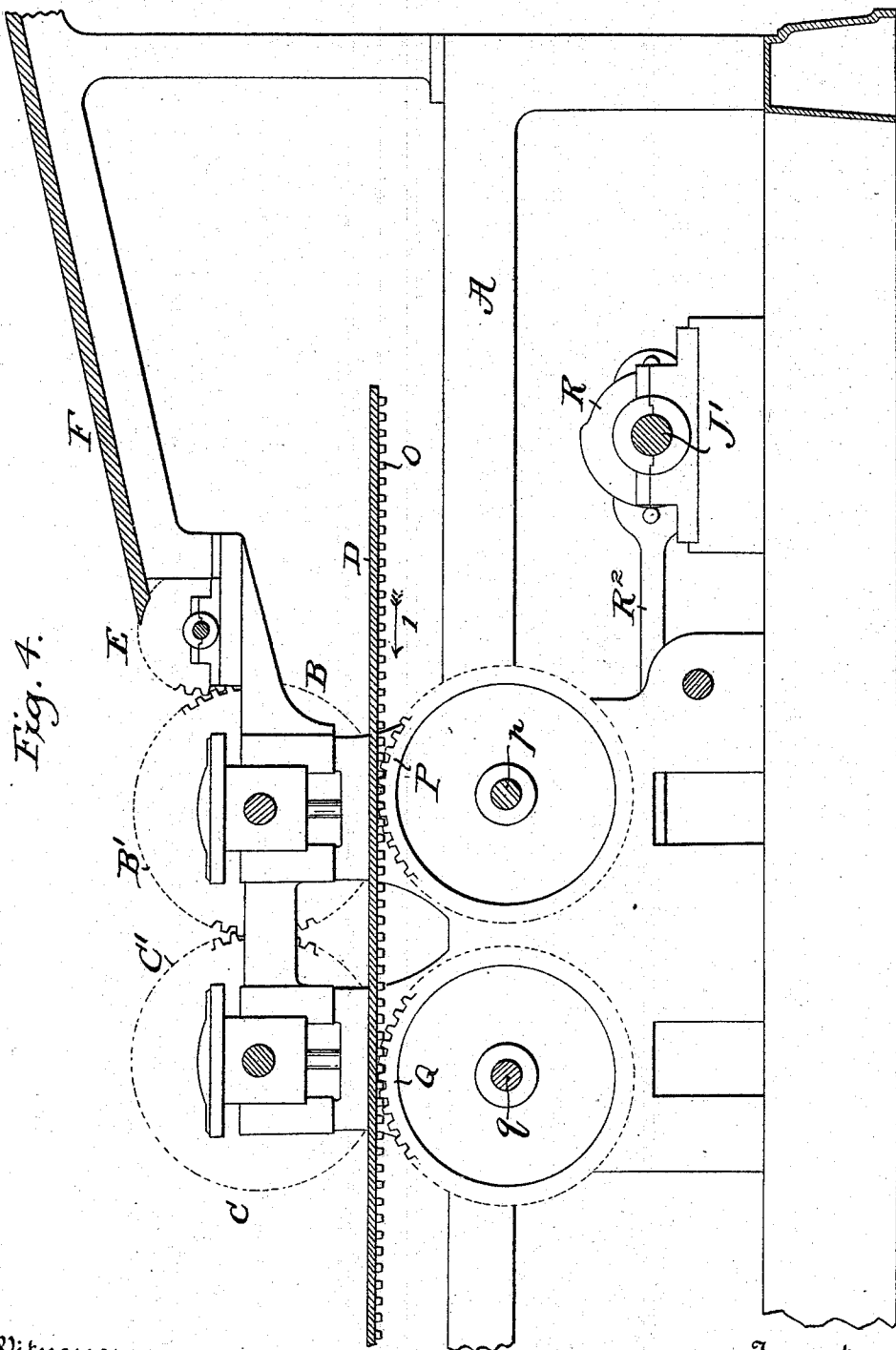
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By his Attorneys  
Graham & Low

# UNITED STATES PATENT OFFICE.

JOHN BROOKS, OF PLAINFIELD, NEW JERSEY, ASSIGNOR TO THE POTTER  
PRINTING PRESS COMPANY, OF SAME PLACE.

## CYLINDER PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 527,941, dated October 23, 1894.

Application filed December 21, 1893. Serial No. 494,316. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN BROOKS, a citizen of the United States of America, residing at Plainfield, Union county, and State of New Jersey, have invented certain new and useful Improvements in Cylinder Printing-Machines, of which the following is a specification.

This invention relates generally to cylinder printing machines and particularly to the means by which the cylinder and form supporting device are moved at uniform surface speed during the impression.

Various devices have heretofore been proposed by which the uniform surface speed of the impression cylinder and form bed during the taking of the impression has been sought; and it is the object of the present invention to improve and simplify the mechanism by which this is accomplished.

The improved devices consist essentially of an impression cylinder and coacting form bed, and substantially a single driver with connections between said device and the cylinder and the bed by which the required uniform surface speed is obtained.

More specifically stated, the devices consist of a crank driven or reciprocated form bed, which bed is provided with a toothed rack adapted to rotate a pair of tooth wheels each of which wheels is arranged to rotate the impression cylinder in opposite directions with means for alternately connecting and disconnecting the tooth wheels with and from the cylinder.

As a full understanding of the improvement may be best had from a detailed description of a practical embodiment of the invention, such description will now be given, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of so much of a cylinder printing machine as is necessary to a proper understanding of the improvement embraced therein. Fig. 2 is a partial cross-section of the machine on the line 2, 2, of Fig. 1. Fig. 3 is a horizontal section looking downward taken on the line 3, 3, of Fig. 2. Fig. 4 is a vertical cross-section on the line 4, 4, of Fig. 2, looking in the direction of the arrow.

Referring to said drawings it will be under-

stood that the improvement is embodied for convenience of illustration in a double or perfecting cylinder machine in which a suitable frame-work A has bearings for a first impression cylinder B, a second impression cylinder C and a reciprocating form carrier or bed D. This particular machine is provided with a feeding in cylinder E adapted to receive sheets in the usual manner from a feed board or other source of supply F, and with the second impression cylinder C there is shown a reciprocating delivery device G arranged to take the printed sheets from the second impression cylinder and carry them outward for piling or to or into some other delivery device such, for instance, as a folding mechanism. These several adjuncts or devices co-operating with the first or only impression cylinder may obviously be modified and substituted by other devices or instrumentalities known in this art without affecting the essentials of the present invention and are simply shown as forming part of one form of an embodiment of the improvements.

The form bed D is mounted in the usual manner not herein shown and is reciprocated back and forth by motion imparted to a traveling gear H through a connecting rod I connected to a crank wrist on a gear wheel J which in turn receives motion from a pinion K on the driving shaft L. The traveling gear H as usual meshes with a fixed rack M and with a rack N on the under side of the form bed.

The form bed D carries on its outer side a driving toothed rack O, see Figs. 1 and 2, which is in constant gear with a pair of toothed wheels P, Q, Figs. 3 and 4 that are arranged on the inner side of the frame-work and secured to the inner ends of shafts *p*, *q*, that are held in suitable bearings in said frame-work. On these shafts *p*, *q*, on the outer side of the framework there is loosely mounted the toothed wheels P', Q', which in turn are in mesh with toothed wheels B', C', that are secured respectively to the outer ends of the shafts of the first and second impression cylinders B, C, and which wheels B', C', are in mesh with one another. As both of the toothed wheels P, Q, are rotated simultane-

ously on each reciprocation of the form bed, it is necessary to provide means by which only the rotation of one wheel P or Q, as the case may be, is imparted to the impression cylinder or one or the other of the impression cylinders. For this purpose the intermediate and loose wheels P', Q', are arranged to be alternately coupled to their respective shafts so that only one will be rotated from the driver during either a forward or backward reciprocation of the form bed. The means for thus transmitting the motion alternately of the wheels P, Q, consist of a pair of sliding clutch members p', q', splined one on each shaft p, q, and each having teeth or pins arranged to engage with notches or perforations in the intermediate wheels P', Q', and thus alternately connect and disconnect said wheels to their shafts. The position and operation of these clutch members are controlled by a suitably shaped cam R secured to the outer end of the shaft J' carrying the wheel J, the intermediate connections between said cam and the clutch members being a pivoted double armed bell crank R' and a connecting rod R<sup>2</sup>. The ends of the arms of the bell crank carry studs engaging with peripheral grooves in the clutch members; and the connecting rod has rolls which embrace opposite sides of the cam R to partake positively of the motion transmitted by the cam without the aid of springs.

In the operation of the machine assuming the form bed to be returning or moving backward in the direction of the arrow 1, Figs. 1 and 4, the cam R has moved the clutch member q', to clutch the intermediate Q' to its shaft q while the other clutch member has disconnected the intermediate P' from its shaft p, so that notwithstanding the fact that both of the wheels P, Q, are rotated by this movement of the bed only the movement of the wheel Q will be transmitted through the intermediate Q' to the cylinder wheel or wheels C', B', to rotate said cylinder or cylinders in harmony with the then direction of movement of the form bed. As the rotation of the cylinder or cylinders is had from the rack O on the bed and the driving and intermediate wheels being of proper size the cylinder or cylinders necessarily move at the same surface speed as the bed. On the other or forward reciprocation of the form bed, the cam R having moved the clutch members p', q', to disconnect the intermediate Q' from its shaft and to connect the intermediate P' to its shaft the rotation of the wheel P will be transmitted through the intermediate P' to the cylinder wheel or wheels B', C', to rotate the cylinder or cylinders in harmony with the then movement of the bed.

As the cylinder or cylinders receive their motion from the form bed it is obvious that their motion will be wholly in unison therewith, that is to say, where the bed is reciprocated by a crank movement and hence has gradually accelerating and retarding move-

ments with a dwell at the end of each reciprocatory movement that similar accelerating and retarding movements and dwells will be imparted to the cylinder or cylinders, so that perfect harmony of surface speed exists throughout the reciprocations of the bed.

It will be observed in the present embodiment that while either one of the intermediates P' or Q' are disconnected from their shafts that they are idle in the sense that they do not serve to impart motion to their connected cylinder wheels but as they are in constant mesh with such wheels the idle intermediate wheel will be rotated loosely on its shaft by reason of the positive rotation of the cylinder wheel with which it is in mesh. This particular construction is not absolutely essential so long as means are provided by which the cylinder wheels are never wholly disengaged from the driver such being the preferred arrangement.

In practice the impression cylinders will be provided with suitable lifting mechanism by which each cylinder will be alternately lifted out of the plane of impression while the other is lowered into the plane of impression. Such mechanism, however, is not herein shown, but may readily consist of the devices set forth in my Letters Patent No. 413,491, dated October 22, 1889, it being understood that in such lifting movements of the cylinders their wheels B' C' will not become disconnected from the intermediates P', Q'.

While a double cylinder printing machine has been shown and described—the present improvement being perfectly adapted to such a machine—it is obvious that the invention may be embodied in a single impression cylinder machine, the cylinder C by slight modification then becoming a delivery cylinder as is common; and that if the delivery cylinder be omitted or occupy a different position from that shown, the cylinder wheel C' may still remain in which case it will act simply as a second intermediate. It is not deemed essential in a single cylinder machine to provide the wheels Q, Q', and C', and the movable clutch member, but their use is preferred in that by the presence of the wheel C' timely movements may be imparted to other adjunctive devices co-operating with the rest of the machine.

While the plain crank movement has been herein shown and described it is obvious that the epicyclic movement set forth in my Letters Patent No. 489,431, dated January 3, 1893, may be substituted therefor without affecting the improvements.

In conclusion it is to be understood that the invention is not necessarily limited to the specific constructions and arrangements of mechanism shown, as it is obvious many changes may be made without materially affecting the invention. The connective and disconnective device interposed in the gearing between the driver and the cylinder and

herein represented by the clutch members  $p'$ ,  $q'$ , may obviously partake of any desired form and be operated by any proper mechanism so long as the cylinder be properly driven.

What is claimed is—

1. The combination with the impression cylinder, and a reciprocating form bed carrying a rack, of a pair of toothed wheels each in constant engagement with the rack, a gear on the cylinder out of mesh with said rack, nonintermeshing intermediate gearing connecting each of the toothed wheels with the cylinder gear for rotating the cylinder, and a connective and disconnective device interposed between said pair of wheels and the cylinder gear whereby said pair of wheels alternately drive the cylinder, as set forth.

2. The combination with the two impression cylinders, and a reciprocating form bed carrying a rack, of a pair of toothed wheels each in constant engagement with said rack, a gear on each cylinder out of mesh with the rack, intermediate gearing connecting each of the toothed wheels with the two cylinder gears for rotating the cylinders alternately, and a connective and disconnective device interposed between said pair of wheels and the cylinder gears whereby said pair of wheels alternately drive the cylinders, as set forth.

3. The combination with the impression cylinder, and a reciprocating form bed carrying a rack, of a pair of toothed wheels each in constant engagement with said rack, gearing

connecting each of the said toothed wheels with the cylinder, clutches for alternately connecting said pair of wheels to said gearing, an arm connecting the movable members of each clutch for simultaneous movement, and positive means for moving the arm, as set forth.

4. The combination with the impression cylinder, and its gear, and a reciprocating form bed having a rack carried therewith, of a pair of toothed wheels each in constant engagement with the said rack, two other wheels for driving the cylinder gear and out of mesh with each other and the rack, clutches for alternately connecting said other wheels with the pair of wheels, and a single cam for moving the clutches, as set forth.

5. The combination with the impression cylinder and a reciprocating form bed having a rack carried therewith, of a pair of toothed wheels each in constant engagement with said rack, two other wheels for driving the cylinder, clutches for alternately connecting said other wheels with the pair of wheels, a single arm for simultaneously moving the clutches and a cam for moving the arm, as set forth.

In witness whereof I have hereunto signed my name in the presence of two witnesses.

JOHN BROOKS.

Witnesses:

GEO. H. GRAHAM,  
H. N. LOW.