

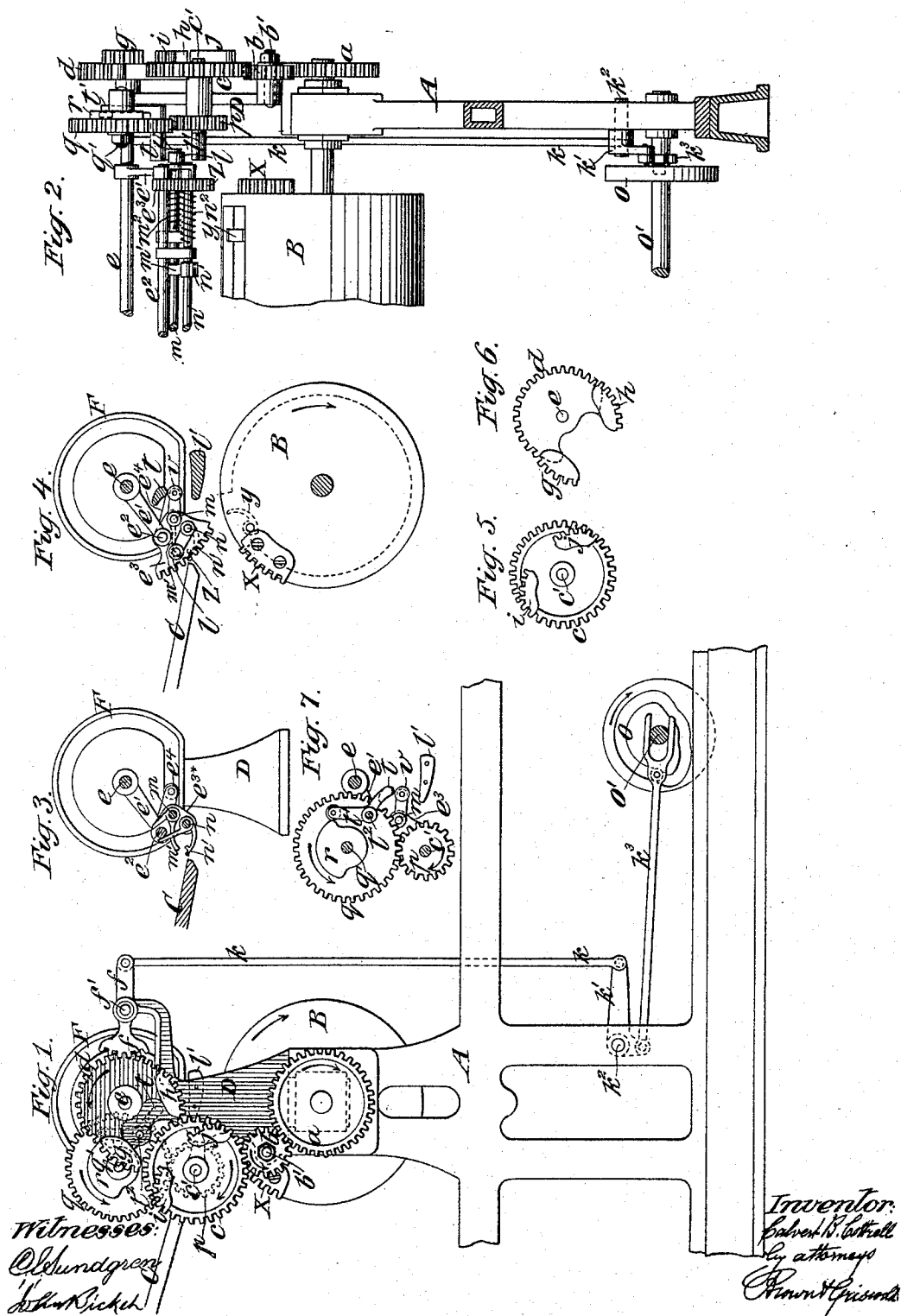
(No Model.)

C. B. COTTRELL.

FEEDING MECHANISM FOR CYLINDER PRINTING MACHINES.

No. 487,254.

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UNITED STATES PATENT OFFICE.

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FEEDING MECHANISM FOR CYLINDER PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 487,254, dated December 6, 1892.

Application filed August 28, 1889. Serial No. 322,173. (No model.)

To all whom it may concern:

Be it known that I, CALVERT B. COTTRELL, of Westerly, in the county of Washington and State of Rhode Island, have invented a new and useful Improvement in Feeding Mechanism for Cylinder Printing-Machines, of which the following is a specification, reference being had to the accompanying drawings.

The object of this invention is to provide in printing-machines with continuously-revolving cylinders for the same accuracy of register that is provided for in stop-cylinder printing-machines.

My improvement consists in the combination, with a continuously-revolving cylinder and grippers thereon for taking the sheet, of an intermittently-rotating gripper-carrier and grippers thereon for receiving a sheet during the intermission of the rotation of said carrier and transferring the said sheet to the grippers on the cylinder during said rotation. It further consists in certain combinations herein-after described and claimed, in which the intermittently-rotating gripper-carrier and grippers hereinabove mentioned are embraced.

I will now proceed to describe my invention with reference to the accompanying drawings and afterward point out its novelty in claims.

Figure 1 represents a side view of the cylinder, part of the framing, and parts of the feeding apparatus of a two-revolution printing-machine illustrating my invention. Fig. 2 is an elevation, partly in section, corresponding with Fig. 1, but taken at right angles thereto. Fig. 3 represents a vertical sectional view of the gripper-carrier and its grippers and a part of the feed-board, corresponding with Fig. 1. Fig. 4 is a side view, partly in section, of the cylinder, gripper-carrier, and part of the gripper-operating mechanism, corresponding with Figs. 1 and 3. Figs. 5 and 6 are side views of portions of the gearing through which motion is transmitted from the cylinder to the intermittently-rotating gripper-carrier. Fig. 7 is a side view of the gripper-operating mechanism, corresponding with Figs. 1, 3, and 4.

Similar letters of reference designate corresponding parts in all the figures.

A designates one of the side frames of the machine, B the impression-cylinder, and C the feed-board.

D represents one of two standards erected upon the side frames A over the cylinder-boxes and containing the bearings for the journals 55 of the shaft e of the intermittently-rotating gripper-carrier. This gripper-carrier consists of two similar arms e' , (only one of which is shown,) a shaft e^2 , having its ends journaled in the said arms, and two plates or hangers 60 e^3 e^{3*} , which are firmly secured to the said shaft e^2 and in which are journaled the ends of two gripper-rods m n , to which are attached the feeding-grippers m' n' , which are to receive the sheets from the feed-board and give 55 or transfer them to the grippers y on the cylinder. The said plate e^3 has upon it a toothed sector Z (shown in Figs. 2 and 4) for the purpose of gearing with a toothed sector X, provided on the cylinder at that end thereof 70 which is shown in Fig. 2, to insure that the feeding-grippers may properly register with those on the cylinder, and that both sets of grippers may move at the same velocity at the time when the latter grippers are to give a 75 sheet to the grippers on the cylinder.

F designates a stationary cam, which is attached to the side frame on the opposite side of the machine to that shown in Figs. 1 and 2. This cam has in it a groove, which receives a 80 roller or stud provided on the end of an arm e^4 , which is fast on the shaft e^2 . The groove of this cam for about two-thirds of its circumference is concentric with the shaft e , but the remainder of the groove is very nearly 85 straight. When the roller or stud on the said arm e^4 is in the concentric part of the cam-groove, the shaft e^2 is prevented from turning in its bearings e' , and the plates or hangers e^3 e^{3*} are practically rigid with the arms e' e' , 90 the sector Z on the plate e^3 being then concentric with the shaft e ; but while the said roller or stud is passing along the straight or nearly straight portion of the cam-groove the plates e^3 e^{3*} and the gripper-rods m n and grippers m' n' have a slight movement relatively 95 to the arms e' of the carrier, for a purpose which will be hereinafter more fully explained.

The gripper-shaft e is geared with the cylinder B by a train of gearing a b c d g h i j . (Shown in Figs. 1, 2, 5, and 6.)

a is a spur-gear fast on the cylinder-shaft. c is a spur-gear of similar size to a , turning

freely on a fixed stud c' , secured in the standard D of the frame A.

b is an intermediate gear, which turns on a fixed stud b' , secured in the standard D, and through which c is geared with a to rotate continuously at the same speed as the latter and in the same direction, as indicated by the arrows shown upon them in Fig. 1.

d is a toothed sector fast on the shaft e of the rotary gripper-carrier. The pitch radius of this sector is proportionately shorter than the radius of the circle in which the points of the feeding-grippers $m' n'$ swing, as the pitch diameter of the gear a is smaller than that of the cylinder diameter, say, one-half. The said radii and diameters being so proportioned, when the sector d is being driven by the gear c the points of the feeding-grippers will have the same speed as the surface of the cylinder. Attached to the outer ends of the gear c are two eccentric segments $i j$, which are arranged to gear with two eccentric sectors $g h$ on the outside of the toothed sector d , the eccentricity of the said sectors being so relatively arranged and proportioned that i and g may gear together to drive the rotary gripper-carrier from the cylinder at a gradually-increasing speed and that h and j may gear together and drive the said carrier from the cylinder at a gradually-diminishing speed.

f , Fig. 1, is a lever working on a fixed fulcrum f' and having at one end a toothed sector which gears with the sector d on the gripper-carrier shaft e . The other end of this lever is connected by a rod k with one arm of an elbow-lever k' , working on a fixed fulcrum k^2 , secured in the frame A, the other arm of the said lever k' having connected with it a yoke-rod k^3 , which is operated by a cam O on a shaft O', which is or may be the same cam-shaft commonly employed in two-revolution cylinder printing-machines for operating the lift motion of the cylinder and which makes one revolution for every two revolutions of the cylinder. The duty of the sector-lever f , operated by the said cam and connections, is to start the rotary gripper-carrier from the position at rest, in which the grippers receive the sheet and to stop the said carrier in such position. The cam O is so shaped that one-half of the circumference of its groove being concentric with shaft O', the lever f will remain stationary during one of every two revolutions of the cylinder and will at the same time by its gearing with the sector d hold the rotary gripper-carrier stationary.

In the position of the cam O and starting-lever f represented in Fig. 1 the sector on the lever f is holding the sector d and the rotary gripper-carrier at rest in position for the feeding-grippers to take a sheet from the feed-board, (see Fig. 3,) and the cam is about to pull down the outer end of the lever f to cause the said lever to turn the sector d in the direction of the arrow shown near it in Fig. 1, and to bring the segment g into gear with the

sector i , which, being actuated by the cylinder-gear a , is coming round to meet it. It may here be remarked that the segments g and h when the rotary gripper-carrier is at rest stand in such a position that the segments i and j will not strike them as the gear c is driven by the cylinder during the second revolution of the latter. As the segment g comes into gear with that i , the sector on the lever f runs up out of gear with the sector d , and the movement of the sector d and gripper-carrier is continued at a gradually-increasing speed by the action of the eccentric sector i upon the eccentric sector g until the pitch speed of the sector d is equal to that of the gear c , when the latter sector comes into gear with the said gear c and the points of the grippers $m' n'$ have a speed corresponding with the surface speed of the cylinder. During the movement of the sector d and gripper-carrier just described, as soon as the sector d permits it, by the gap in said sector coming opposite the sector on the starting-lever f , the outer end of said lever is raised by the cam and its sector is moved downward to a position in which the sector d could not strike it. The eccentric segments h and j then come into gear and the movement of the gripper-carrier derived from the cylinder through said sectors is reduced in speed until at the proper time the starting-lever f is again pulled down by the cam and its sector again enters the sector d , and the movement of the latter sector and the carrier is then continued by the sector on the said lever f until the cam O by its action through the rod k^3 , lever k' , and rod k brings the lever f to the position of rest hereinbefore mentioned. The concentric semicircular portion of the groove of the cam O then coming into action on the rod k^3 stops the further movement of the lever f and consequently stops the gripper-carrier, which is then held at rest, while the said concentric portion of the cam-groove continues, passing the rod k^3 —that is to say, during the complete revolution of the cylinder.

It will be understood that the sheet is to be received while the gripper-carrier is in the position of rest last mentioned. The grippers are to be opened, as shown in Fig. 3, while the carrier is in that position and are to be closed to take the sheet while the gripper-carrier is in the same position. It will also be understood that the grippers are to be again opened to deliver the sheet to the cylinder-grippers when the gripper-carrier in its rotation with the points of the grippers at the same speed as the cylinder arrives in the same position in which its grippers arrive in proper relation to the cylinder-grippers.

I will now proceed to describe the means and method of opening and closing the grippers. The gripper-rods $m n$ have applied to them spiral springs $m^2 n^2$, coiled round their rods $m n$ and secured thereto in the usual manner to keep the grippers closed when not otherwise opened. To enable the grippers to

receive the sheet from the feed-board C, the upper gripper-fingers m' are raised. This operation is effected by a roller v , attached to the gripper-rod m , being brought by the revolution of the gripper-carrier against a cam t . This cam at the time of its operation is stationary; but in order that it may be moved out of the way during every second revolution of the cylinder it is constructed or formed upon the lower end of a lever t' , which works on a fulcrum-pin t^2 , secured in the standard D, and the upper end of which carries a roller which is operated upon by a cam r , which is fast to a gear q , which turns upon a fixed stud q' , secured in the standard D. This gear q and the attached cam derive their necessary motion from a gear p , having half the pitch-diameter of q , fastened to the gear c . The upper fingers of the grippers are closed by the spring m^2 as the roller v escapes from the cam t just as the gripper-carrier is started in its rotary motion by the lever f .

The opening movement of the grippers to deliver the sheet to the cylinder consists of the downward movement of the gripper-fingers n' . This is effected by a roller or stud l on an arm which projects from the gripper-shaft n , passing under a stationary cam l' , secured to the standard D.

It has been hereinbefore mentioned that a portion of the groove of the stationary cam F, in which the roller e^4 , attached to the gripper-shaft e^2 , works, is straight, or nearly so. The object of the straight portion of the groove is to cause the points of the grippers to move relatively to the feed-board immediately after receiving the sheet therefrom, and to permit them to move in a circle concentric with the shaft e^2 at the time of delivering the sheet to the cylinder-grippers, the gripper-rods $m n$ are journaled in plates or hangers connected with the shaft e^2 , which is journaled in the arms e' . Were it not for these different directions which it is desired to give to the movement of the points of the fingers, the gripper-rods $m n$ might be pivoted in the arms e' or their equivalents rigidly attached to the shaft e .

I have not thought it necessary to particularly describe the grippers y on the cylinder, as these may be constructed and operated in the same way as grippers commonly employed in cylinder printing-machines.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with the continuously-revolving cylinder of a printing-machine and grippers on said cylinder, of an intermittently-rotating gripper-carrier and grippers thereon for receiving a sheet during the intermission of the rotation of said carrier and transferring the said sheet to the grippers on the cylinder during said rotation, substantially as herein set forth.

2. The combination, with the continuously-revolving cylinder of a printing-machine and

a set of grippers on said cylinder, of an intermittently-rotating gripper-carrier and a set of feeding-grippers thereon, a concentric sector secured fixedly on the shaft of said carrier, a cam-actuated toothed sector-lever engaging with said concentric sector for starting and stopping the said carrier, and concentric toothed gears between the said cylinder and concentric sector for driving the said carrier from the cylinder with the points of their respective sets of grippers at the same speed, substantially as herein described.

3. The combination, with the continuously-revolving cylinder of a printing-machine and grippers on said cylinder, of an intermittently-rotating gripper-carrier and feeding-grippers thereon, and a cam-actuated lever having a toothed sector, and a toothed sector on said cylinder gearing with the first-named sector for starting and stopping said carrier, substantially as herein set forth.

4. The combination, with the continuously-revolving cylinder of a printing-machine and grippers on said cylinder, of an intermittently-rotating gripper-carrier and grippers thereon, a cam-actuated lever having a toothed sector, a sector on said gripper-carrier to gear with the first-named sector for starting and stopping said carrier, and eccentric segments through which said carrier is geared with the cylinder for the purpose of gradually accelerating the speed of said carrier after starting and gradually reducing the speed thereof before stoppage, substantially as herein set forth.

5. The combination, with the continuously-revolving cylinder of a printing-machine and a set of grippers on said cylinder, of an intermittently-rotating gripper-carrier and a set of grippers thereon, a concentric toothed sector and two eccentric toothed sectors attached to said carrier, a gear rotating with the cylinder and gearing with said concentric toothed sector, eccentric toothed sectors carried by said gear and gearing with the first-named eccentric sectors, and a cam-actuated starting-lever having a toothed sector for gearing with said concentric sector on the carrier, substantially as and for the purpose herein described.

6. The combination, with the feed-board and continuously-revolving cylinder of a printing-machine, of a rotary gripper-carrier, consisting in part of rotating arms e' and a shaft for carrying the same, a shaft e^2 , journaled in said arms, hangers $e^3 e^{3*}$, secured to the said shaft e^2 , grippers supported in said hangers $e^3 e^{3*}$, an arm e^4 on said shaft e^2 , and a stationary cam F, with which said arm engages to direct the movement of the points of the grippers during the rotation of the carrier, substantially as and for the purpose herein set forth.

7. The combination, with the continuously-revolving cylinder of a printing-press and a rotary gripper-carrier, consisting in part of

rotating arms e^1 and a shaft for carrying the same, of the shaft e^2 , journaled in the said arms, the hangers e^3 e^{3*} , carried by said shaft e^2 , and one of which is toothed, grippers supported in said hangers, the stationary cam F,
5 the arm e^4 on said shaft e^2 , engaging with said cam, and the toothed sector X on the cyl-

inder for gearing with said toothed plate, substantially as and for the purpose herein set forth.

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Witnesses:

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C. E. LUNDGREN.