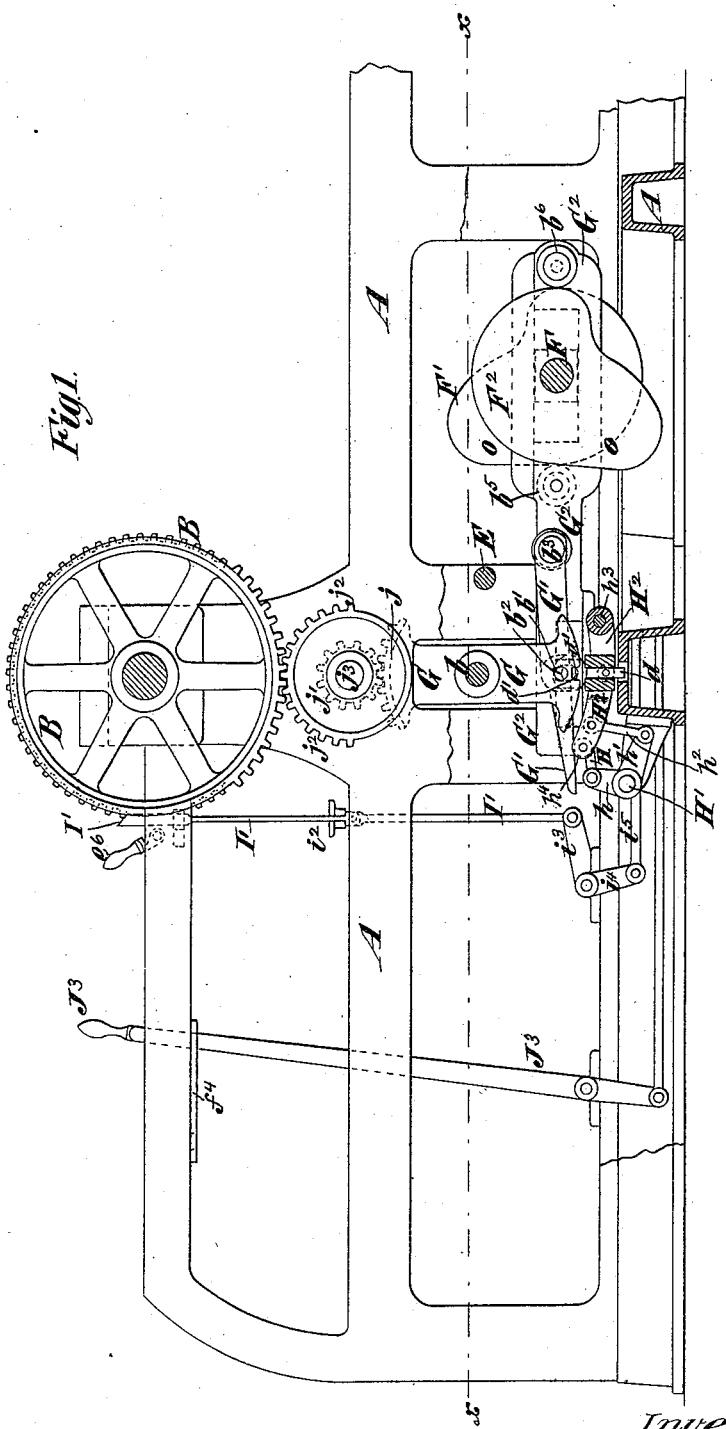
(No Model.) 3 Sheets—Sheet 1.

C. B. COTTRELL.

STOP CYLINDER PRINTING MACHINE.

No. 347,922. Patented Aug. 24, 1886.

Fig. 1.



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Inventor:
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(No Model.) 3 Sheets—Sheet 2.

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STOP CYLINDER PRINTING MACHINE.

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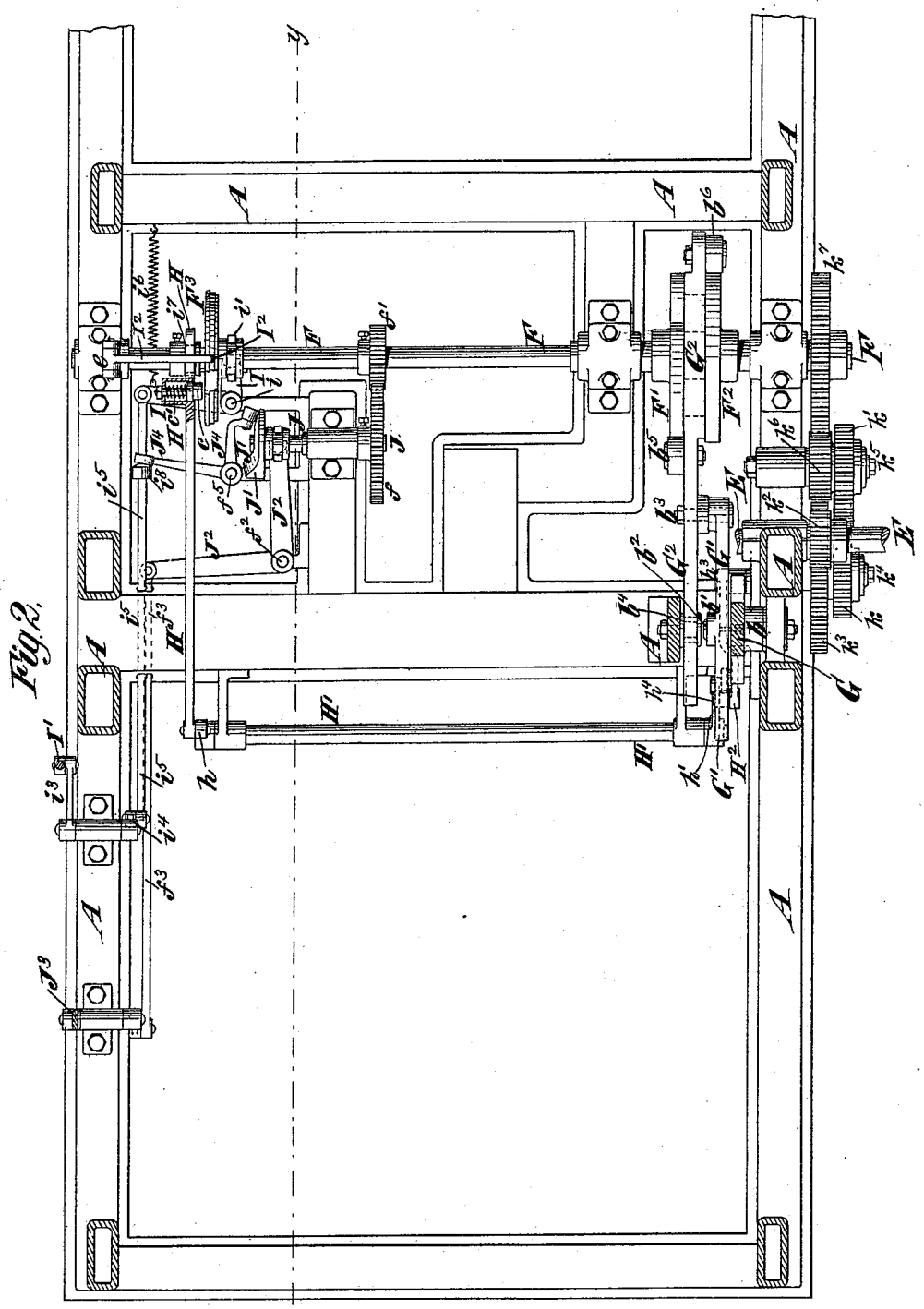

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

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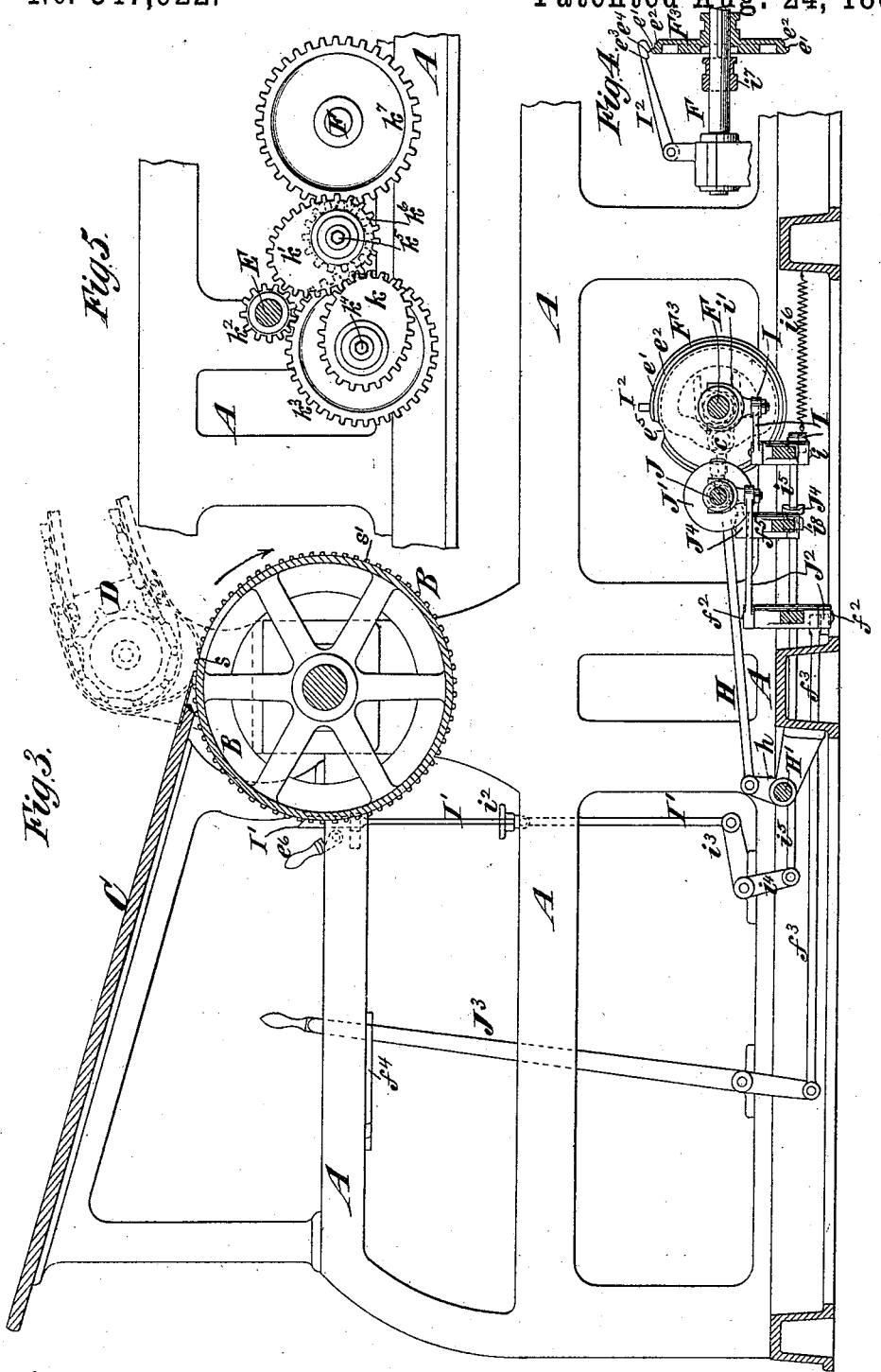

Witnesses:
C. L. Sundgren
Emil Herter.

Inventor:
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UNITED STATES PATENT OFFICE.

CALVERT B. COTTRELL, OF STONINGTON, CONNECTICUT.

STOP-CYLINDER PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 347,922, dated August 24, 1886.

Application filed May 22, 1886. Serial No. 202,936. (No model.)

To all whom it may concern:

Be it known that I, CALVERT B. COTTRELL, of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Stop-Cylinder Printing-Machines, of which the following is a specification.

In stop-cylinder printing presses or machines the cylinder is geared with the bed during printing, but as the bed-rack leaves the cylinder-segment at the end of its movement in the direction to print, a segment on the cylinder comes into gear with a starting-lever, and as the bed commences its next printing movement the cylinder is turned by the starting-lever and acquires a surface velocity equal to that of the bed, so that it will come into proper gear with the bed. The starting-lever is operated by a cam-actuated gab-hook engaging a pin on the lever, and whenever it is desired to trip the cylinder so as to prevent it from coming into gear with the bed, the gab-hook is lifted off the pin on the starting-lever. To operate with double rolling, the cylinder is tripped automatically at each second revolution.

In my Patent No. 338,390, dated March 23, 1886, I have shown upon the under side of the gab-hook a reciprocating guard or shield, which maintains the notch in the hook closed, except at the times when the gab-hook can safely be lifted off or drop into engagement with the pin on the starting-lever. According to that patent the labor of lifting the gab-hook to trip at will is to be performed by the operator through a foot-rod, and as soon as the operator desires to throw in the cylinder the foot-rod is released and the gab-hook drops on the pin in the starting-lever, and when the notch in the hook is uncovered by the reciprocating guard the hook drops into engagement with the pin.

According to my present invention, the lifting of the gab-hook by tripping mechanism is effected by a tripping-cam through a rod which preferably has a roller or pin for engaging the cam, and one of the parts—the cam, for example—is movable through setting-connections under control of the operator, to bring the cam and rod into proper relative position for engagement, and I also employ a spring whereby the cam and rod will be automatically engaged when the cam by its rotation comes to proper position. This spring may be applied to the roller or pin carried by the tripping-rod and on which the tripping-cam acts; and when the operator desires to trip the cylinder, all that is necessary for him to do is to set or shift the movable part—the cam, for example—so that as soon as the cam reaches the proper point the roller or pin on the rod will spring into engagement with the cam, and the said rod and the tripping mechanism which it operates will be actuated to lift the gab-hook. The cam may be held in operative position by a latch or hook and have a notch at the proper point in its periphery, and after the cam has by its rotation performed its function of lifting and holding up the gab-hook, it is moved by a spring away from the rod, which it operates as soon as the notch in its periphery reaches the latch or hook, and the gab-hook is then allowed to descend upon the pin in the starting-lever, and at the proper time comes into engagement therewith. With this arrangement of parts the operator simply moves the tripping-cam into proper position for operation, and at the proper time said cam operates the tripping mechanism to lift the gab-hook. The ordinary double-rolling cam operates through the same setting connections to bring the tripping-cam and the rod which it actuates into proper relative position for engagement.

The part of my invention above described may be employed with different varieties of sheet-delivery apparatus; but I prefer to employ endless chains, which are arranged above the cylinder and extend therefrom forward to a receiving-table at the further end of the press, and which are provided with delivery-grippers, such an arrangement being shown in my Patents Nos. 305,797 and 305,798, dated September 30, 1884. When I employ such delivery apparatus, I find it desirable to have the cylinder travel about a quarter of a revolution (more or less,) beyond the position for taking a sheet, in order to facilitate the delivery of the printed sheet, and then the cylinder is returned to the proper position for taking a sheet, and there remains until it is started forward with a sheet at proper time to come

into gear with the bed. The motion necessary to return the cylinder to a proper position for taking the sheet and the starting of the cylinder forward must be performed by the starting-lever, and in the absence of any special arrangement of parts this large movement to be produced by the starting-lever would necessitate large cams with abrupt and hard-working points for operating the gab-hook and starting-lever.

To avoid the objections above-referred to, I modify the mechanism through which the starting-lever is operated, and through which it actuates the cylinder, as follows: Instead of driving the cam-shaft at a uniform speed, I employ for that purpose a train of gear-wheels, which comprises two eccentric or cam-shaped wheels, whereby the speed of said shaft is temporarily accelerated at the part of its revolution corresponding to the steep or abrupt points of its cams without interferring with its period of revolution. To this same end I interpose between the starting-lever and the cylinder two concentric gear-wheels of different sizes, which rotate as one, and the sector on the starting-lever engages the smaller of these wheels, while the larger of them gears into the cylinder-segment.

My invention consists in novel combinations of parts, to which I have above referred, and which are hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a sectional elevation of such parts of a printing press or machine as are necessary to illustrate my invention, a portion of the side frame being removed. Fig. 2 is a horizontal section on the plane of the dotted line *x x*, Fig. 1. Fig. 3 is a sectional elevation on the plane of the dotted line *y y*, Fig. 2. Fig. 4 is a sectional view lengthwise of the cam-shaft, showing the tripping-cam and its latch or hook; and Fig. 5 is an elevation of the train of wheels through which said cam-shaft is driven.

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

A designates the main frame, B the impression-cylinder, and C the feed-board, of the machine. I have shown by dotted lines at D parts of a sheet-delivery apparatus, such as is shown in my aforesaid Patents Nos. 305,797 and 305,798, and I prefer to use an arrangement of cylinder-grippers such as forms the subject of my pending application, Serial No. 202,937, filed of even date herewith. I have not here shown these grippers, as they constitute no part of my present invention.

E designates the main cross-shaft of the press, and F the cam-shaft, which is driven as I shall soon describe.

G designates the starting-lever, which is fulcrumed at *b* and is operated by a gab-hook G′, having in it a notch, *b′*, which engages a pin, b^2, on the lever. As in my aforesaid Patent No. 338,390 the gab-hook G′ is pivoted at b^3 to a reciprocating bar, G^2, which slides upon and is guided by a box or bearing, b^4, on a part of the frame A, and is reciprocated by two cams, F′ F^2, on the shaft F, engaging bowls or rollers b^5 b^6 on opposite sides of the bar G^2, as best shown in Fig. 2.

Upon the cam-shaft F is a face-cam, F^3, which operates upon a roller or pin, *c*, on a rod, H, and thus transmits motion through suitable tripping mechanism to raise the gab-hook G′ out of engagement with the pin b^2. The tripping mechanism here shown comprises a rock-shaft, H′, having an arm, *h*, with which the cam-actuated rod H is connected, and an arm, *h′*, which is connected by a rod, h^2, with a lever, H^2, fulcrumed at h^3 and carrying at the free end a roller, h^4, which underlies the gab-hook G′, as best shown in Fig. 1. When the rock shaft H′ is turned in one direction, the lever H^2 raises the gab-hook G′ off the pin b^2, and when the shaft is turned in the other direction the lever descends and the gab-hook falls onto the pin and reciprocates idly thereon until its notch *b′* drops into engagement threwith.

To lock the cylinder, I may employ a vertically-sliding locking-bolt, *d*, which is connected with the lever H^2, as described in my aforesaid Patent No. 338,390, and which may be raised into engagement with a notch, *d′*, in the lever G, as best understood from Fig. 1.

From the foregoing description it will be understood that all that is necessary to trip the cylinder is to bring the tripping-cam F^3 and rod H into proper relation for engagement, and that then the gab-hook G′ will be lifted automatically and certainly at the proper time. To accomplish this, the cam F^3 is arranged to slide upon its shaft F, it being locked to turn therewith by a feather or spline and groove, and the cam is movable toward the rod H by means of suitable setting-connections under control of the operator. The setting-connections here shown comprise a horizontally-swinging lever, I, fulcrumed at *i*, and carrying on one arm a fork, *i′*, which engages the grooved hub of the cam F^3, as shown in Fig. 2; also a vertically-moving rod, I′, on which is a foot-pad, i^2, and a bell-crank lever, with one arm, i^3, of which is connected the rod I′, and the other arm, i^4, of which is connected by a rod, i^5, with the lever I. A spring, i^6, is connected with the lever I for moving the cam F^3 away from the rod H when it is released.

The rod H is held against side movement by sliding upon a grooved collar, i^7, on the shaft F, and the roller or pin *c* is supported by a spring, *c′*, as shown in Fig. 2, so that it will yield to the cam F^3 when the latter is brought against it, and will automatically spring into engagement with the groove of the cam F^3 when the latter by its rotation is brought into proper position for engaging therewith.

In order to hold the tripping-cam F^3 in operative position until such time as it may be

released without danger of the gab-hook G' coming unduly into engagement with the pin b^2 on the starting-lever G, I employ a latch or hook, I^2, which is pivoted at *e*, and engages the cam F^3. The nose of the hook is tapered, as shown in Fig. 4, and when the cam F^3 is moved into operative position it lifts the latch or hook, and the latter drops over the edge of the cam, holding the latter in position against the force of the spring i^6. As shown in Fig. 4, the cam F^3 is rabbeted, so as to form two shoulders, e' e^2, and the latch or hook I^2 has two corresponding shoulders, e^3 e^4, of different projections. The cam F^3 also has a peripherical notch, e^5, and when this notch is brought opposite the latch or hook by rotation of the cam the cam will be released, and the spring i^6 will move it out of engagement with the roller or pin *c*. Although this roller or pin is interposed between them, the cam may be generically considered as engaging with the rod H. The cam F^3 is intended to be moved sufficiently far for the shoulder e^4 of the latch or hook I^2 to catch upon the shoulder e^2 of the cam; but in case it is moved a little short of this point, the latch or hook will catch the shoulder e', and the cam will be operative to move the rod H.

When it is desired that the cylinder shall remain stationary for a time, as when running the bed for inking up the form, the rod I' may be pushed down, and there held by a lock or catch, e^6, (shown in Figs. 1 and 3,) engaging its upper end.

Upon a short shaft, J, geared with the cam-shaft F by wheels *f f'*, which give it a revolution for each two revolutions of the shaft F, is the double-rolling cam J'. This cam may be moved into operative position by a bell-crank lever, J^2, fulcrumed at f^2, with which a hand-lever, J^3, is connected by a rod, f^3. This lever J^3 may be engaged with a locking-plate, f^4, for double rolling. The double-rolling cam J' acts upon the setting-connections before described in order to shift the tripping-cam F^3 into operative position at each second revolution of the shaft F. As here shown, the cam J' operates the setting-connections through a bell-crank lever, J^4, fulcrumed at f^5, and bearing against a collar, i^8, on the rod i^5.

In Fig. 3 I have shown the cylinder B with its receiving edge *s* in position to take a sheet, and when delivery apparatus of the kind shown at D is employed, I prefer that the movement of the cylinder B in the direction of the arrow shall be continued after making a complete revolution about a quarter of a turn, more or less—say, until the receiving edge comes to the position *s'*—in order to facilitate the delivery of the printed sheet. The cylinder is then turned back until its receiving edge comes to the position *s*, ready for taking the next sheet. To accomplish this the starting-lever G has to impart a considerable movement to the cylinder, and instead of having the sector *j* of the starting-lever gear directly with the cylinder, I interpose between them two wheels, *j' j²*, of unequal diameters, which are secured to a shaft, j^3, so as to turn as one. The lever sector *j* engages the smaller of these wheels, *j'*, and the larger wheel, j^2, gears into the cylinder-segment. By this arrangement the necessary movement of the starting-lever is reduced in length.

To give the cams $F' F^2$ a temporarily-accelerated speed at the points *o*, which have the greatest throw, and which are necessarily most abrupt, I interpose in the train of wheels which drives the shaft F from the shaft E eccentric or cam-shaped wheels *k k'*. (Best shown in Fig. 5.) As here shown this train of wheels (see Figs. 2 and 5) comprises a pinion, k^2, on the shaft E, gearing into a large wheel, k^3, on a shaft, k^4, which also carries the cam-shaped wheel *k*. On the shaft k^5 of the other cam-shaped wheel, *k'*, is a pinion, k^6, which gears into a wheel, k^7, on the cam-shaft F. By this arrangement of gearing the speed of the shaft F is temporarily increased without interfering with its proper periods of revolution, and very abrupt and bad-working points in the cams $F' F^2$ are avoided.

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

1. The combination, with the impression-cylinder, its starting-lever, and a cam-actuated gab-hook engaging a pin upon said lever for starting the cylinder, of connections, substantially as described, whereby the gab-hook may be raised to free it from engagement with the starting-lever, and a tripping-cam and cam-actuated rod for operating said connections, one of said parts being movable to bring the said cam and rod into position for engagement, and a spring for producing the automatic engagement of the cam and rod when the cam by its rotation reaches the proper position, substantially as herein set forth.

2. The combination, with the impression-cylinder, its starting-lever, and the cam-actuated gab-hook for operating the starting-lever, of tripping mechanism, substantially as described, for raising the said gab-hook to free it from the starting-lever, a tripping-cam having a sliding connection with its shaft, and a rod for operating the tripping mechanism to raise the gab-hook, having a spring-supported roller or pin, which will yield to permit of the cam being slid to proper position for engagement therewith, and will automatically spring into engagement with the cam when the latter by its rotation comes to proper position, substantially as herein set forth.

3. The combination, with the shaft F and the tripping-cam F^3, sliding thereon and having a notch in its circumference, of the rod H and its spring-supported pin or roller *c*, on which the cam acts, setting-connections, substantially as described, under control of the operator for sliding the cam toward said rod, a spring for returning the cam, and a hooked catch for engaging the notched circumference of the cam, substantially as herein set forth.

4. The combination, with an impression-

cylinder, its starting-lever, and a cam-actuated gab-hook for operating the lever, of tripping mechanism, substantially as described, for raising the gab-hook, a tripping-cam and a rod for operating said mechanism, and which are movable one relatively to the other for bringing them into proper relation for engagement, a spring for producing the automatic engagement of the cam and rod when the cam by its rotation reaches the proper position, setting-connections, substantially as described, under control of the operator for bringing said tripping cam and rod into position for automatic engagement, and a double-rolling cam operating through the same setting-connections for bringing said tripping cam and rod into position for automatic engagement, substantially as herein set forth.

5. The combination, with the shaft F, the sliding tripping-cam F^3, the rod H, with its spring-supported roller or pin *c*, and the lever I and rod i^5, for shifting the tripping-cam, of the double-rolling-cam J′, and the lever J^2, actuated thereby and connected with the lever I, for shifting the tripping-cam, substantially as herein described.

6. The combination, with the impression-cylinder, its starting-lever, and the cam-shaft, the cams and gab-hook for operating the lever, of tripping mechanism, substantially as described, comprising a tripping-cam on said cam-shaft for raising the gab-hook, and setting-connections, substantially as described, under control of the operator, whereby said tripping mechanism may be set in position for automatic operation by the tripping-cam at the proper time, substantially as herein set forth.

7. The combination, with the impression-cylinder, its starting-lever, the cam-shaft and cams, and the cam-actuated gab-hook for operating the starting-lever, of a shaft having a uniform rotary motion and gearing comprising eccentric gear-wheels through which motion is transmitted from the uniformly-rotating shaft to the cam-shaft, whereby provision is afforded for employing cams having easier working-points to operate the starting-lever, substantially as herein described.

8. The combination, with an impression-cylinder, a starting-lever provided with a toothed sector and a cam-actuated gab-hook for operating the lever, of two concentric gear-wheels rotating as one and of different sizes, the larger wheel being in gear with the cylinder-segment and the smaller wheel in gear with the sector on the starting-lever, whereby a comparatively small movement of the lever and gab hook will produce the required movement of the cylinder, substantially as herein described.

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