

(No Model.)

4 Sheets—Sheet 1.

C. B. COTTRELL.

SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

No. 246,371.

Patented Aug. 30, 1881.

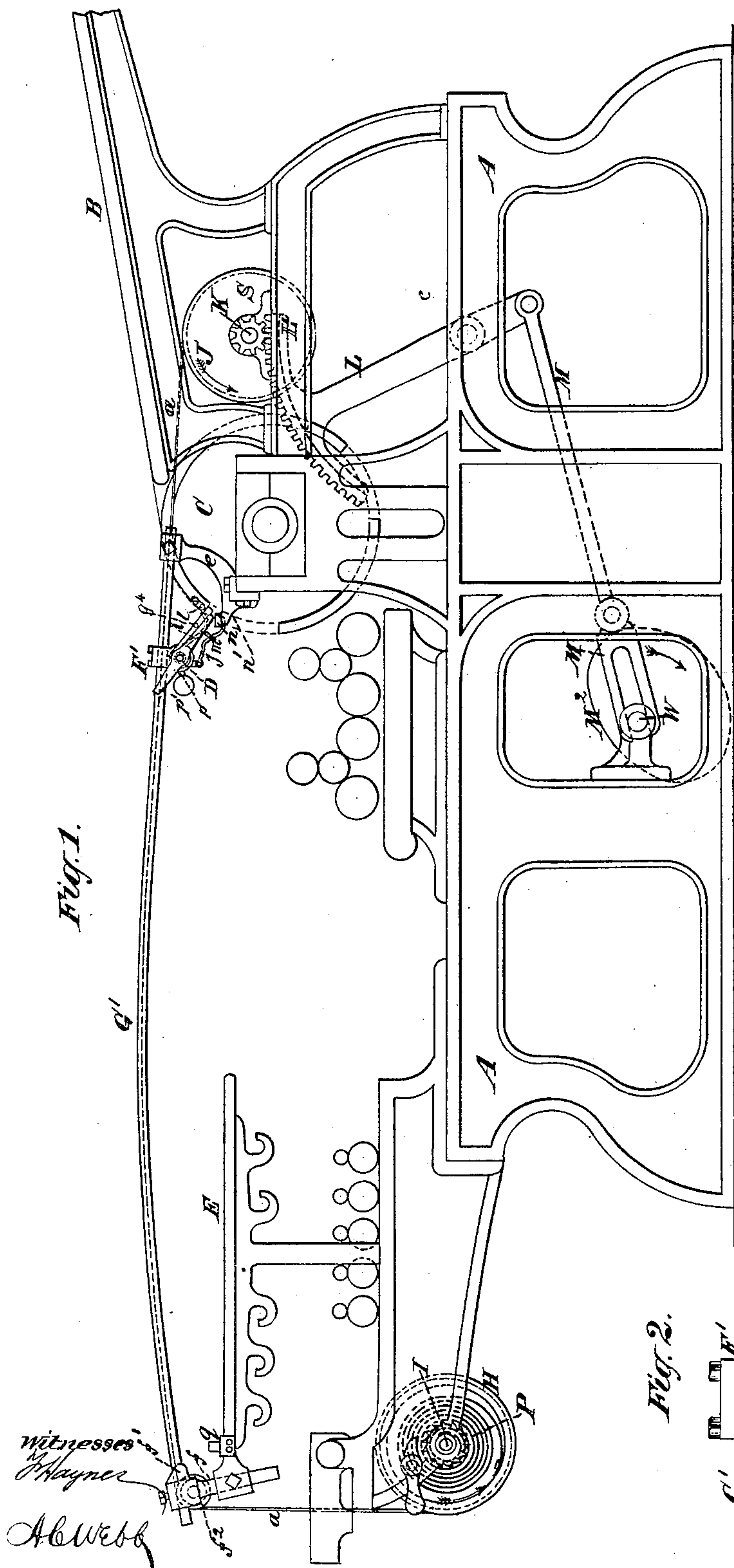
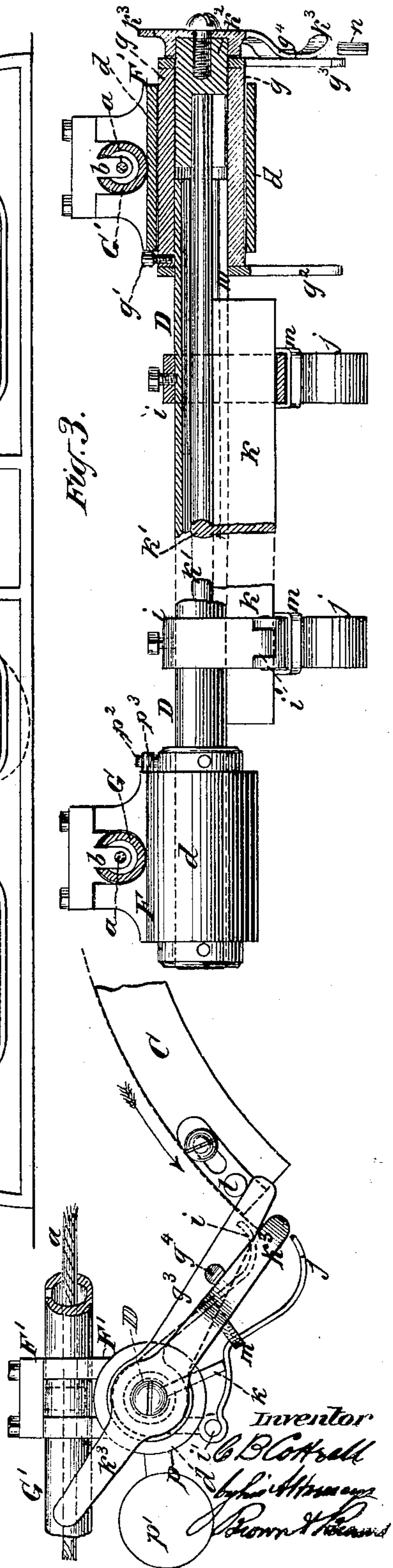


Fig. 2.



(No Model.)

4 Sheets—Sheet 2.

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Abraham

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(No Model.)

4 Sheets—Sheet 3.

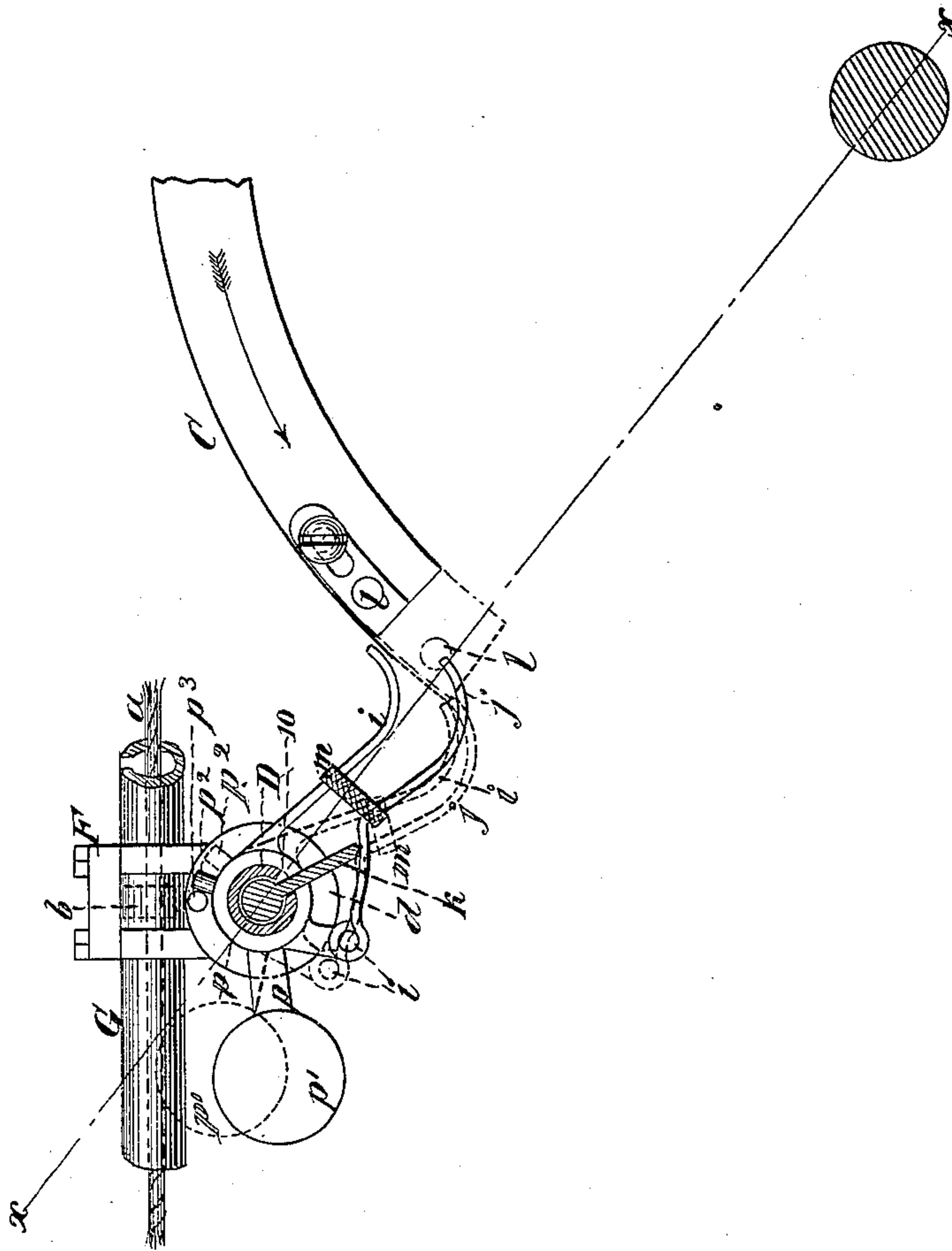
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Fig. 5.



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(No Model.)

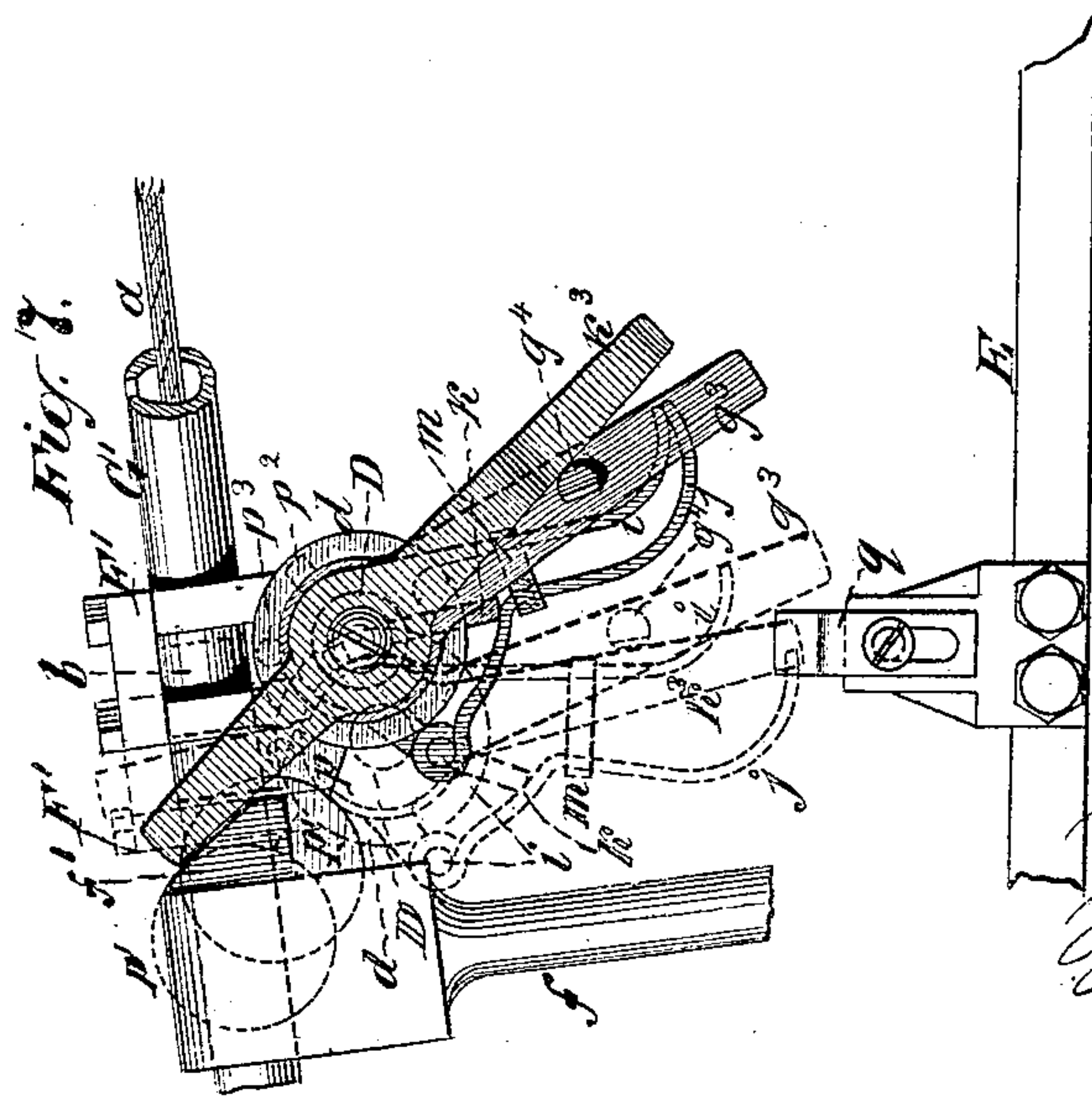
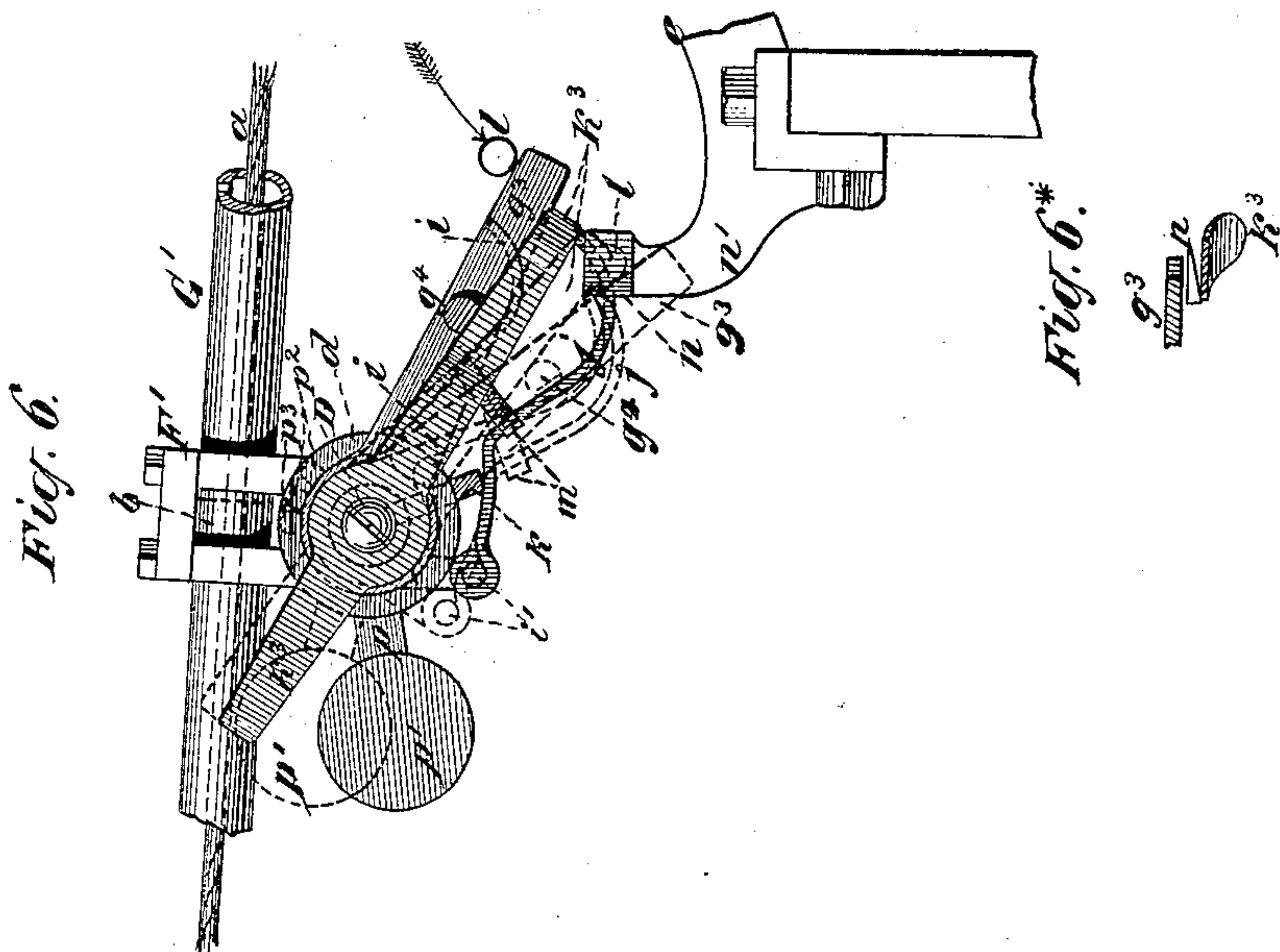
4 Sheets—Sheet 4.

C. B. COTTRELL.

SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

No. 246,371.

Patented Aug. 30, 1881.



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CALVERT B. COTTRELL, OF WESTERLY, RHODE ISLAND.

SHEET-DELIVERY APPARATUS FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 246,371, dated August 30, 1881.

Application filed January 25, 1881. (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 certain new and useful Improvements in Sheet-Delivery Apparatus for Cylinder Printing-Machines, of which the following is a specification.

This invention relates to gripers which are employed to take the sheet from the front of the impression-cylinder of the machine and carry it to and deliver it upon the receiving-table with the last-printed side upward.

The invention consists in a novel construction and arrangement of and method of operating such grippers, whereby some essential advantages are obtained, among which one of the most important is that the said grippers may be thereby made to take the sheet with greater certainty than the delivery-grippers heretofore employed to take sheets from the front of the impression-cylinder. Certain features of the invention are, however, applicable not only to two-revolution cylinder-presses, but to stop-cylinder presses also.

The invention is illustrated in the accompanying drawings, in which Figure 1 is a side elevation of such of the parts of a two-revolution cylinder printing-press as are necessary to illustrate my invention, the other parts being omitted. Fig. 2 is an end view of the delivery-griper shaft and one of its carriages, a portion of the impression-cylinder, and part of one of the ways on which the carriage runs on a larger scale than Fig. 1. Fig. 3 is a longitudinal view of the said griper-shaft and its carriages, partly in section, showing also transverse sections of the ways on which the carriages run on a scale corresponding with Fig. 2. Fig. 4 is a plan corresponding with Fig. 1. Fig. 5 is a transverse sectional view of the delivery-griper shaft and grippers and part of the cylinder. Fig. 6 is an end view of the griper-shaft and the principal parts of the opening and closing mechanism, illustrating the method of closing the grippers to take the sheet from the cylinder. Fig. 6* is a horizontal sectional view of parts shown in Fig. 6. Fig. 7 is a similar view, illustrating the method of opening the grippers to deliver the sheet on the receiving-table. Figs. 5, 6, and 7 are on the same scale as Figs. 2 and 3.

A is the main framing of the press; B, the feed-board; C, the impression-cylinder. E is the receiving board or table, arranged at the opposite end of the framing to the feed-board. 55

The cylinder C and the reciprocating type-bed may have motion imparted to them by the usual or any suitable means, the cylinder having a continuous revolution, and being fitted, as usual, with grippers for taking the sheet from the feed-board and holding it during the printing. These grippers, being well known, are not represented in the drawings. 60

D is the delivery-griper shaft or griper-stock, arranged to oscillate in journal-boxes *d d* provided in two carriages, F F', which are fitted to slide on the exteriors of fixed parallel upwardly-arched ways G G', which are arranged lengthwise of the press, one on each side thereof, each extending from a point outside of its respective end of the cylinder C to a point over or beyond the farthest end of the receiving-board. These ways G G' are tubular, and for convenience are made of wrought-iron gas-pipe, and are slotted longitudinally on their upper sides for the purpose hereinafter explained. They are supported by brackets *e* on the cylinder-standards and by standards *f* on the receiving-board stand. 65 70 75

The two griper-carriages F F' are secured one to each of two wire ropes or other cords or chains *a a*, each of which passes right through one of the tubular ways G G', and is secured at one end to the periphery of one of two drums or pulleys, H H, on a shaft, I, at the receiving-board end of the machine, and secured at the other end to the periphery of one of two drums or pulleys, J J, on a shaft, K, under the feed-board, passing also over pulleys *f*² attached to the standards *f*. The said ropes, cords, or chains are wound upon their respective drums or pulleys H H and J J to a sufficient length to allow them to move the carriages F F' and the griper-shaft D on the ways G G' from a line nearly over the cylinder to a line over or beyond the back of the receiving-board. The connections *b b* between the ropes or cords *a a* and the carriages F F' pass through and work in the slots in the tops of the tubular ways, as shown in Fig. 3. 80 85 90 95 100

The shaft K of the drums J J is furnished with a pinion, S, which gears with a toothed

sector, L' , on the upper end of the lever L , which works on a fixed fulcrum, c , and the lower end of which is connected with the rod M of a cam-yoke, M' , which works on the rotary shaft N , and is acted upon by a cam, M^2 , on the said shaft in such manner as to cause the sector and pinion to turn the shaft K in a direction to move the griper-shaft carriages from the receiving-board toward the cylinder.

10 The cam-shaft N may be the driving-shaft of the press or any other shaft suitably driven.

The shaft I of the drums H H has a spring, P , coiled around it, and so applied as to tend to turn the said drums in the direction of the arrow shown on one of them in Fig. 1, and so to cause the said drums to draw the griper-shaft carriages from the cylinder toward the receiving-board.

20 The delivery-griper shaft D is hollow, and for convenience may be made of wrought-iron gas or steam pipe. Its under side is slotted longitudinally, as shown at 10 in Figs. 3 and 5. At one end it is journaled directly into the box d of the carriage F , but at the other end it is furnished with a sleeve, g , which is rigidly secured to it by a set-screw, g' , as shown in Fig. 3, and which forms the journal which works in the box d of the other carriage, F' . The upper jaws, i i , of the grippers are rigidly attached to the shaft D and only move therewith, and the lower jaws, j j , are hinged to the upper ones by hinges i' , arranged eccentrically below the shaft, the jaws being therefore arranged and operating in a manner precisely the reverse of that which is usual in delivery-grippers—that is to say, the opening and closing movement being made by the under jaw of each, or the one nearest the center of the cylinder, instead of by the upper jaw, or the one farthest from the center of the cylinder.

40 Springs of various kinds may be employed to close the jaws; but for the sake of convenience I propose to use a simple india-rubber band, m , round each pair of jaws.

45 To provide for the opening of the jaws, there is a blade-like cam, k , working through the longitudinal slot 10 of the griper-shaft D , and acting directly against the jaws j j of the grippers, the shaft k' of the said cam being within and concentric with D . One end of the said shaft k' is keyed into a head, k^2 , (see Fig. 3,) which fits as an inner journal within a portion of the sleeve-like griper-shaft journal g . To the outer end of this head k^2 there is secured firmly a laterally-elastic lever, k^3 , for the purpose of turning the shaft k' independently of the griper-shaft to operate the cam k . On opposite ends of the sleeve-like journal g of the griper-shaft D there are rigidly secured, either to the said journal or directly to said shaft, two arms, g^2 g^3 , (see Fig. 3,) the inner one, g^2 , being within reach of a pin or projection, l , (see Fig. 2,) on the corresponding end of the cylinder, near the periphery thereof, and the outer one, g^3 , being furnished externally with a beveled projection, g^4 , over which the laterally-elastic le-

ver k^3 slips, and under which it catches to lock the cam-shaft k' and cam k , as shown in Fig. 2, in position to hold the grippers open.

70 The griper-shaft is furnished, as shown in Figs. 2, 4, 5, 6, and 7, with an arm, p , on which there is a weight, p' , which exerts a constant tendency to turn the shaft in a direction to force the grippers upward as far as permitted by a projection, p^2 , on the shaft, and a stop, p^3 , on the carriage F , as shown in Fig. 5. When the said projection is against the said stop the upper jaws of the grippers have an inclination such as is shown in Figs. 1 and 2, and in bold outline in Fig. 5, which is the inclination 80 which they have at all times except when taking or delivering the sheet; but this weight leaves the grippers free to swing or move downward when sufficient force is applied to turn them and their shaft in opposition to the action of 85 said weight.

For the purpose of unlocking the griper-opening cam and allowing the jaws of the grippers to close upon the sheet to take it from the cylinder there is attached to a bracket, n' , on 90 one of the cylinder-standards, a fixed wedge, n , which is so arranged that the arm g^3 on the griper-shaft may pass on one side of it and the turned-out end of the elastic lever k^3 on the cam-shaft k' may pass on the other side of it, 95 as shown in Fig. 6*, at the proper time, as will be hereinafter fully described, and that the said lever may be thereby sprung aside far enough to slip over the projection g^4 on the said arm g^3 , and so leave the grippers to be 100 closed by their springs m .

For the purpose of opening the grippers to liberate the sheet so that it may be deposited upon the receiving-table E , there are provided upon the receiving-board, or upon suitable 105 fixed portions of the press adjacent thereto, as shown in Figs. 1, 4, and 7, two stops, f' and q , the said stops being so arranged that the upper end of the lever k^3 may first strike the stop f' , and the arm g^3 may afterward strike the 110 stop q as the griper-shaft carriages, griper-shafts, and grippers are about to complete their movement from the cylinder to and over the receiving-table.

115 The operation of taking the sheet from the cylinder and delivering it upon the receiving-table is as follows: While the griper-shaft carriages, with the griper-shaft and grippers, are moved by the cam M^2 from the receiving-table toward the cylinder, the grippers are open, and the weight p' , holding the projection p^2 on the griper-shaft against the stop p^3 , keeps the upper jaws, i , of the delivery-grippers about the inclination shown in Figs. 1, 2, and in bold outline in Fig. 5, so that the points of the said 125 jaws, when, at the end of the movement of the carriage, they are brought close enough to the periphery of the impression-cylinder to take the sheet therefrom, are some distance above an imaginary line, x x , drawn between the center of the cylinder and the center of the griper-shaft, as shown in Fig. 5. The cylinder has 130

now arrived at such stage of its rotation that the opening provided in it for its own grippers is opposite the lower jaws, j , of the open delivery-grippers, which enter the said opening, 5 so that the front edge of the sheet may be brought over them and under the jaws i by the continued rotation of the cylinder. The pin or projection l on the cylinder has now arrived in contact with the arm g^2 of the griper-shaft, as 10 may be understood by reference to Fig. 2, the said arm being exactly in line with g^3 in that figure. By the continued rotation of the cylinder the pin or projection l , acting on the arm g^2 , turns the griper-shaft in the opposite direc- 15 tion to the rotation of the cylinder, but causes the points of the grippers to move in approximately the same direction as the cylinder and at approximately the same speed therewith. Just as the points of the upper jaws, i , arrive 20 at the line xx , where they are nearest the center of the cylinder, the lower laterally elastic and flexible turned-out end of the elastic lever k^3 of the cam-shaft is forced, by passing over the wedge n , out beyond the end of the projection 25 g^4 on the arm g^3 , and the griper-opening can being thus unlocked, the grippers are closed by the upward or outward movement from the cylinder of their lower jaws, j , produced by their springs m , the upper jaws being still moving 30 with the cylinder, and both jaws continuing to move with the cylinder until the sheet has been released by the cylinder-grippers, after which, the pin l having passed by the end of the arm g^2 , the grippers are allowed to be raised by the 35 weight p' until the projection p^2 strikes the stop p^3 . This action of the grippers may be understood by reference to Figs. 2 and 6. The movement of the griper-carriages $F F'$ along the ways $G G'$ toward the receiving-table now takes 40 place so rapidly that the sheet, with its last-printed side upward, will be kept flying in a horizontal, or nearly horizontal, position from the time it leaves the cylinder until it arrives over the receiving-table, the upward arching 45 of the ways causing it to be carried up so high that it will not fail to clear the inking apparatus between the cylinder and the said table. As the carriages and grippers are arriving near the end of this movement the upper 50 end of the lever k^3 on the cam-shaft k' comes in contact with and is stopped by the stop f' , as shown in bold outline in Fig. 7, and the continued movement causes the said lever to turn the grippers downward without opening them 55 until the lower end of the arm g^3 of the griper-shaft is stopped by the stop q , after which the slightly-continued movement of the carriage causes the laterally-elastic lever k^3 to press so hard on the beveled side of the projection g^4 60 on the arm g^3 , against which it has been resting, that it will slip over the said projection, as shown in dotted outline in Fig. 7, and so allow the cam-shaft to open the grippers and leave the sheet free to fall on the receiving- 65 table. The grippers are now locked in an open condition by the lever k^3 and projection g^4 , and

so remain during the whole of their movement toward the cylinder, which now takes place, and until the carriages have begun to move back again from the cylinder, as previously 70 described, the wedge n being inoperative as the grippers move toward the cylinder, because it is so low that the arm k^3 , which is then held up with the grippers by the weight p' , passes above it without touching it. 75

I will remark, in conclusion, that the movement of the grippers with the cylinder at the time of taking the sheet, instead of being effected by the pin l on the cylinder, might be effected by a cam or any other suitable means. 80 I will also remark that the grippers supported in carriages working on ways, as described, might be used in a stop-cylinder press, in which case the oscillating movement of the griper-shaft to cause the grippers to move with the 85 cylinder might be dispensed with, and in which case, also, the wedge n for tripping or unlocking the grippers to enable them to close might be movable instead of stationary.

What I claim as my invention, and desire to 90 secure by Letters Patent, is—

1. In a cylinder printing-press, the combination, with the impression-cylinder, of an oscillating delivery-griper shaft and attached grippers and means, substantially as herein described, for imparting to the said griper-shaft 95 at the time of its griper's taking the sheet from the cylinder a motion on its axis in a direction the reverse of the rotary motion of the cylinder, whereby the points of said grippers are 100 caused to move with the cylinder and approximately in the same direction therewith at the time of taking the sheet, substantially as herein described.

2. The combination, with the griper-carriages, of the ropes, cords, or chains $a a$, the drums or pulleys $J J$, shaft K , pinion S , sector-lever $L L'$, cam M^2 , drums or pulleys $H H$, shaft I , and spring P , substantially as and for the purpose herein set forth. 105 110

3. The combination, with the impression-cylinder and an oscillating delivery-griper shaft arranged in front thereof, of grippers the upper jaws of which, or those farthest from the periphery of the cylinder, are rigidly attached 115 to the said shaft, and the lower jaws of which, or those nearest the periphery of the cylinder, are hinged to the said shaft to and below the axis of the said shaft, substantially as herein described. 120

4. In a cylinder printing-press, the combination, with the cylinder, of delivery-grippers, an oscillating shaft to which both the upper and the lower jaws of said grippers are attached, carriages containing bearings for said shaft, an 125 arm on said shaft, and a projection or pin on the end of the cylinder for operation upon said arm to produce the movement of both the upper and the lower jaws of the grippers with the cylinder, substantially as herein described. 130

5. The combination, with a hollow longitudinally-slotted griper-shaft and attached grip-

ers, of a cam-shaft working within said griper-shaft and carrying a griper-opening cam which works through the slot in said griper-shaft, substantially as herein set forth.

5 6. The combination, with the hollow longitudinally-slotted griper-shaft and attached grippers and the griper-opening cam-shaft working within the said griper-shaft, of a locking device, substantially as herein described, for
10 locking the two shafts together with the grippers open.

7. The combination of the hollow longitudinally-slotted griper-shaft D and attached spring-closed grippers, the cam-shaft k' , and
15 cam k for opening the grippers, the locking device $g^3 g^4 k^3$, and the griper-opening stop f' , substantially as and for the purpose herein described.

8. The combination of the griper-shaft D and attached spring-closed grippers, the cam-shaft 20 k' and cam k , the locking device $g^3 g^4 k^3$, and the stationary wedge n for disengaging the said locking device, substantially as herein described.

9. The combination of the griper-shaft and 25 grippers, a cam-shaft placed within the griper-shaft and carrying a cam for opening the grippers, a locking device, substantially such as is herein described, for locking the said shafts together, and a stationary wedge attached to 30 the framing of the machine for unlocking the said locking device, as herein set forth.

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