

(No Model.)

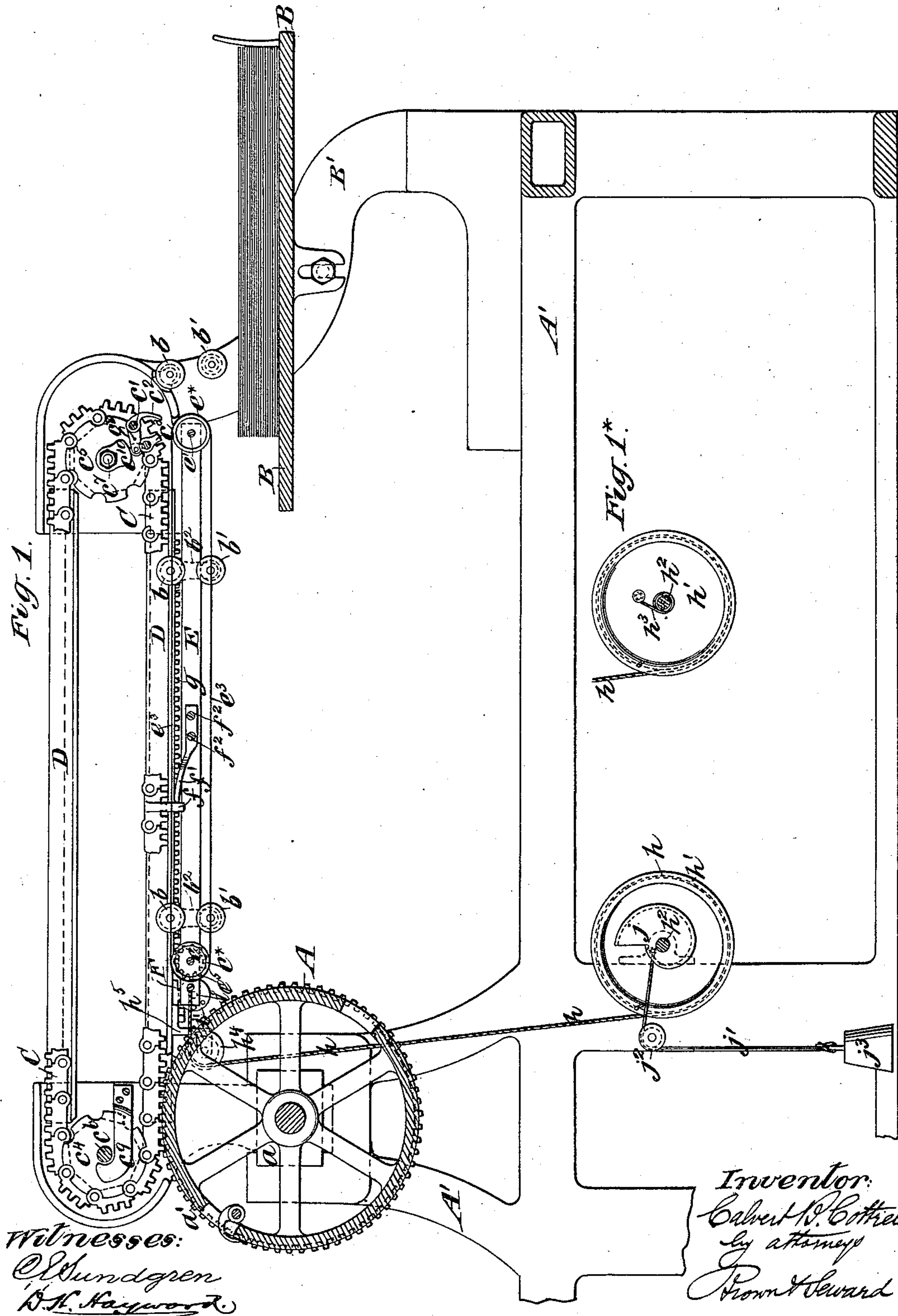
3 Sheets—Sheet 1.

C. B. COTTRELL.

SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

No. 430,378.

Patented June 17, 1890.



(No Model.)

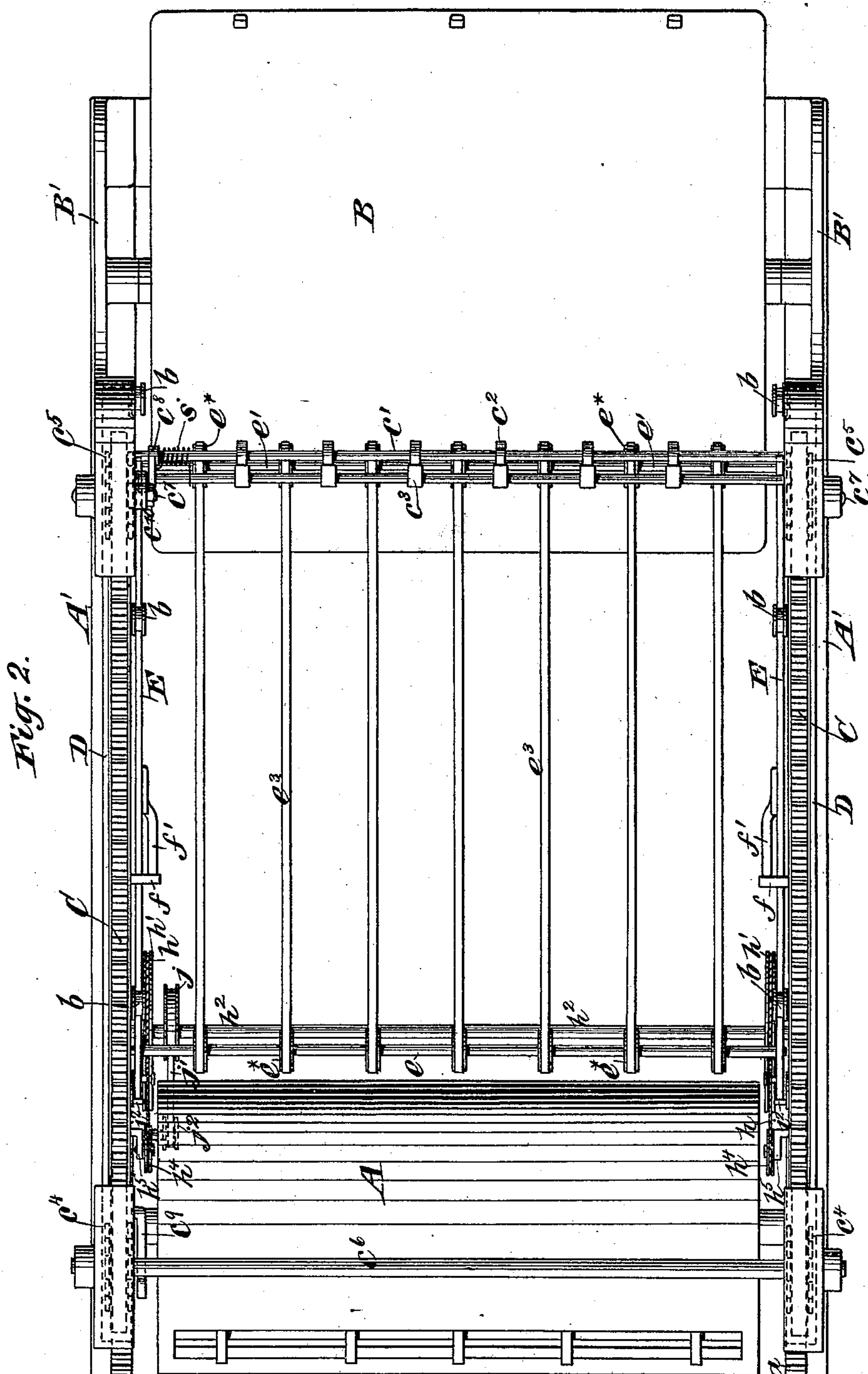
3 Sheets—Sheet 2.

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SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

No. 430,378.

Patented June 17, 1890.



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(No Model.)

3 Sheets—Sheet 3.

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No. 430,378.

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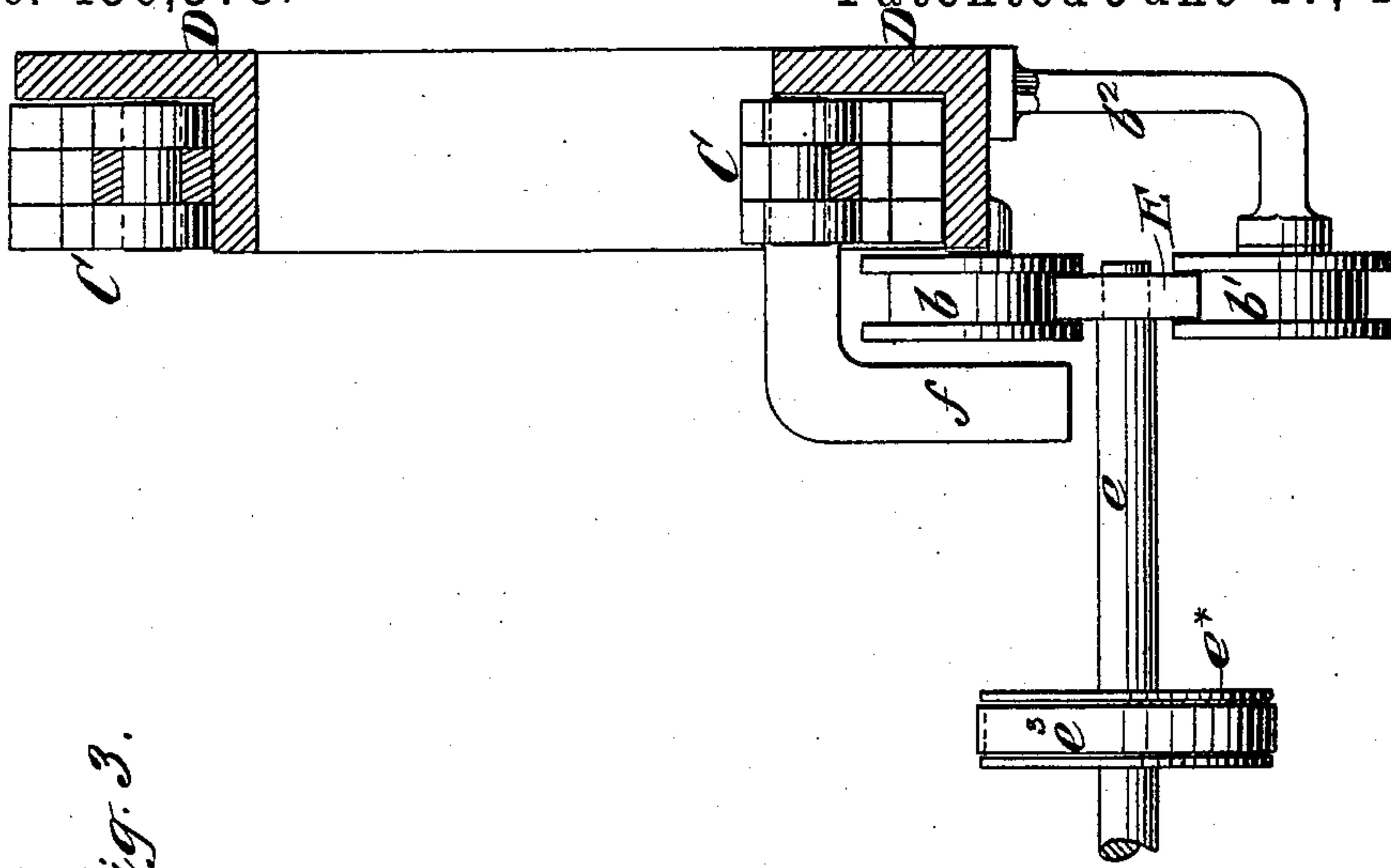


Fig. 3.

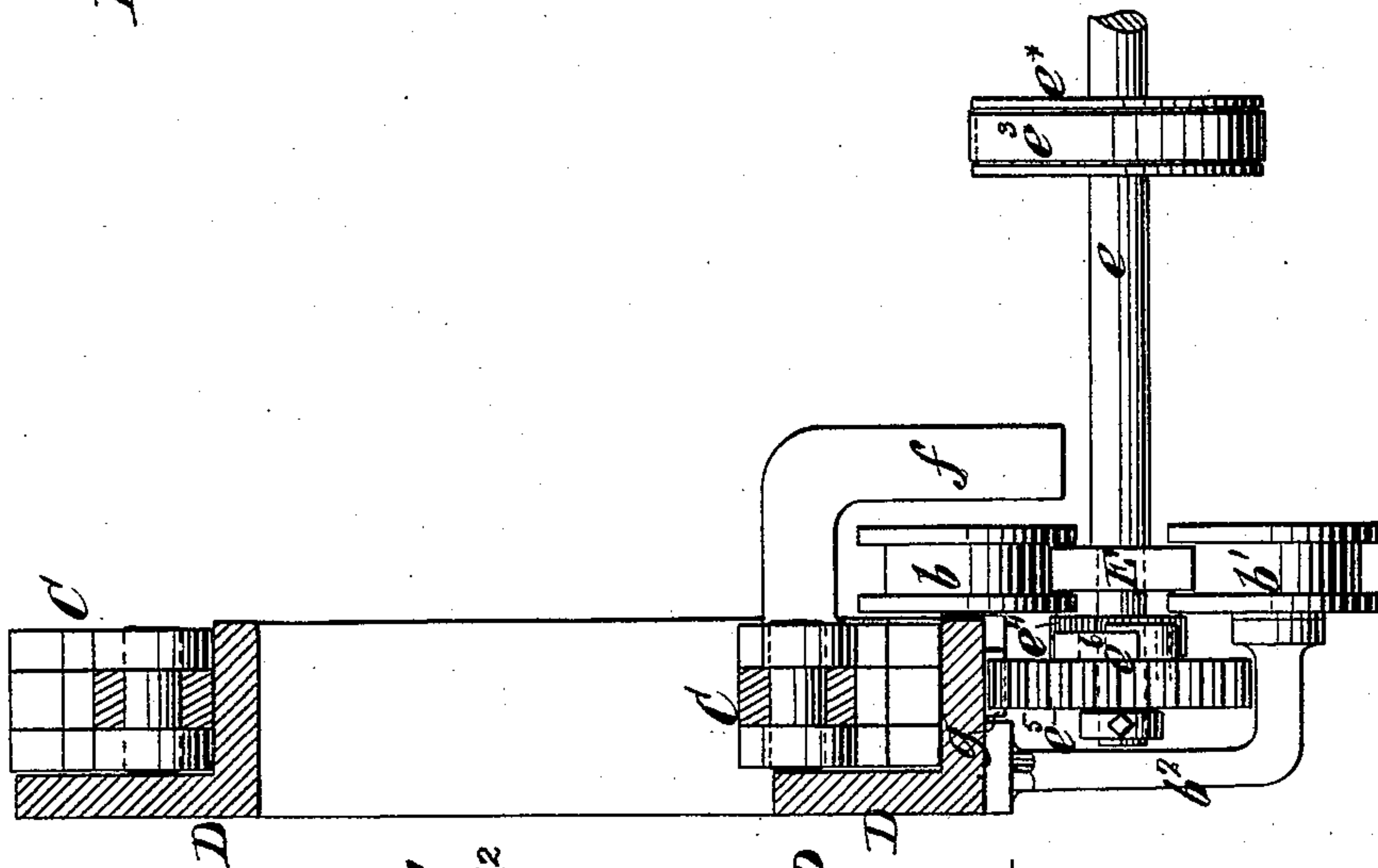


Fig. 6.

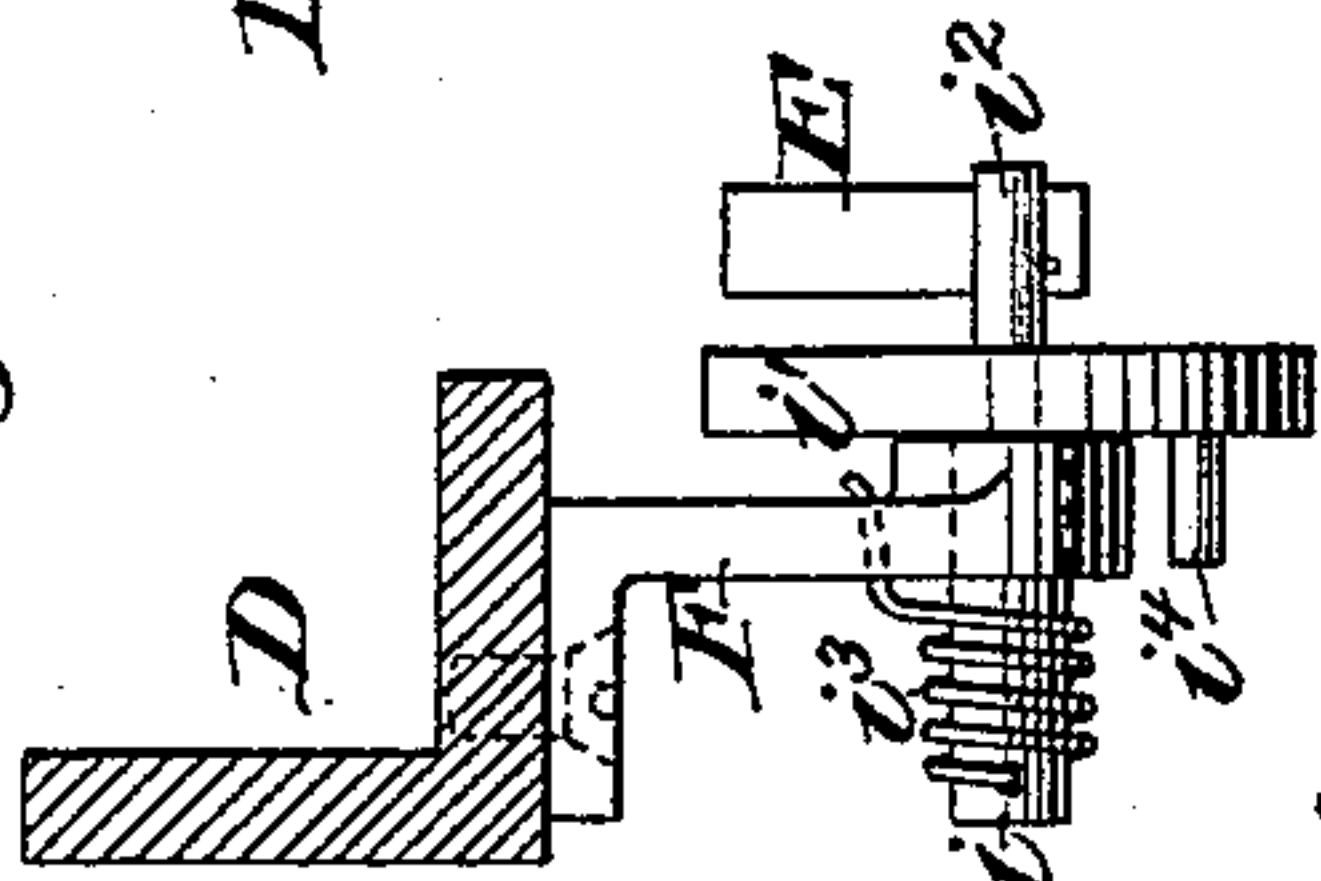
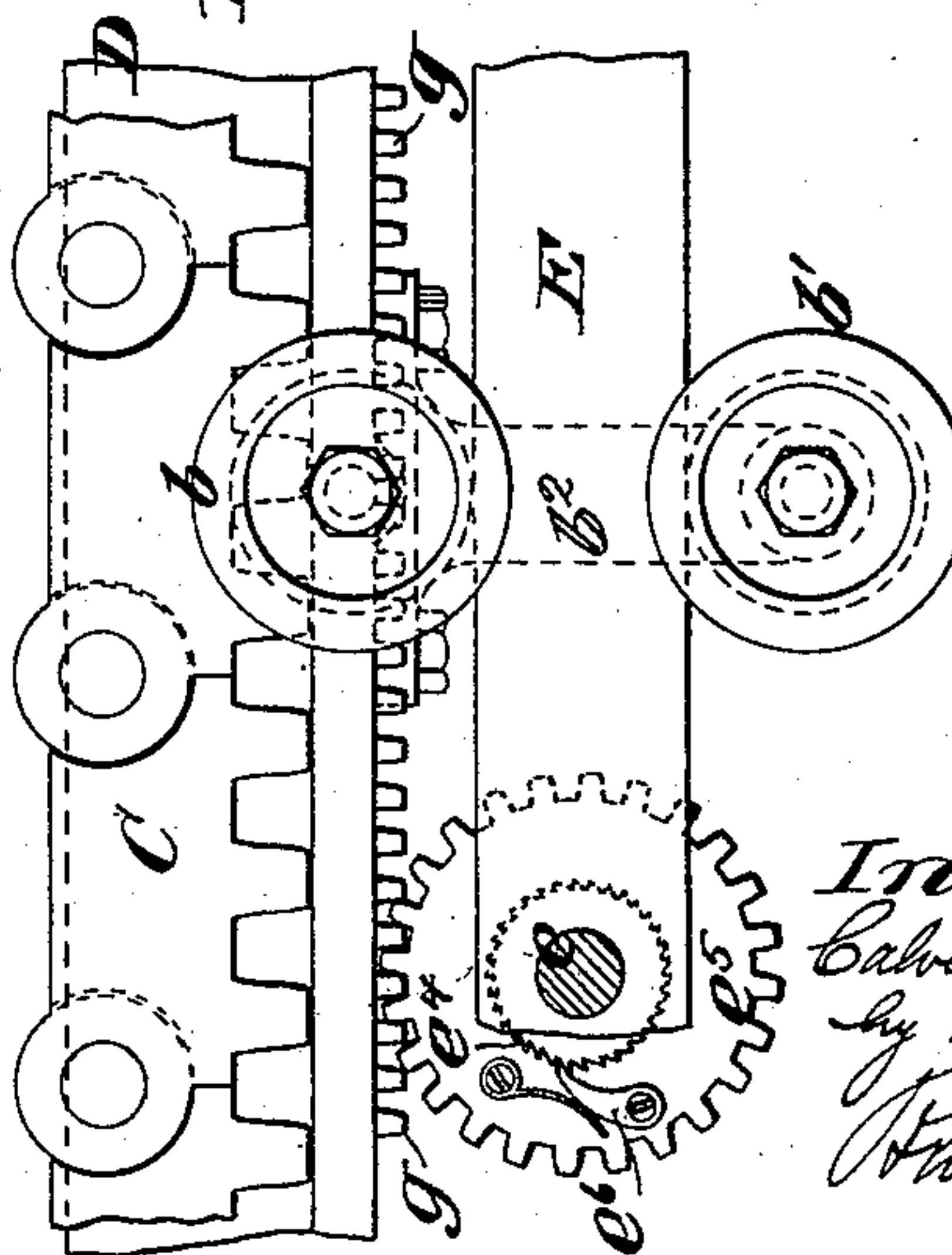


Fig. 5.

Fig. 4.



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UNITED STATES PATENT OFFICE.

CALVERT B. COTTRELL, OF WESTERLY, RHODE ISLAND.

SHEET-DELIVERY APPARATUS FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 430,378, dated June 17, 1890.

Application filed March 29, 1890. Serial No. 345,854. (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 Sheet-Delivery Apparatus for Printing-Machines, of which the following is a specification, reference being had to the accompanying drawings.

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

Figure 1 is a longitudinal vertical sectional view of such parts of a cylinder printing-machine as are necessary to illustrate my invention. Fig. 1* is a sectional view in the same plane as Fig. 1, exhibiting a modification of part of the machine. Fig. 2 is a plan corresponding with Fig. 1. Fig. 3 is a transverse vertical sectional view of the delivery apparatus and its appurtenances on a larger scale than Figs. 1 and 2. Figs. 4, 5, and 6 are detail views, to be hereinafter explained, on the same scale as Fig. 3.

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

A designates the impression-cylinder, supported in journal-boxes *a* in the framing A' of the machine.

B is the receiving-table, supported between standards B', erected upon the framing A' at the front end of the machine—that is to say, the end farthest from the cylinder.

Between the cylinder A and the table B, but at some distance above them, is the delivery apparatus proper, which, as here represented, consists of two toothed endless chains or endless toothed racks C and grippers *c'* *c*² *c*³, carried by the said chains. The said chains or racks are supported by chain-wheels *c*⁴ *c*⁵, the chain-wheels *c*⁴—one for each chain—being fast on a shaft *c*⁶, journaled in upward extensions of the cylinder-boxes *a*, and the chain-wheels *c*⁵, turning loosely on fixed studs *c*⁷, fast in the receiving-table standards B'. The said chains or racks are supported between the wheels *c*⁴ *c*⁵ by stationary tracks or ways D, and they are driven at the same speed as the cylinder by means of gears *a'* on the cylinder, which gear with their teeth.

The grippers represented are of a well-known kind, consisting of a gripper-bar *c'*, journaled in the endless racks and having fingers or grippers *c*², and a rest-bar *c*³. In the example represented, which is for a two-revolution press, there is only one set of grippers, and the length of the chain is equal to twice the circumference of the cylinder, in order that the grippers may be brought in proper relation to take the sheet after every two revolutions of the cylinder. The grippers are represented as to be opened to receive the sheets from the cylinder by the arm *c*⁸, attached to the bar *c'*, passing over a stationary cam *c*⁹, secured to the framing, and to be opened again to deliver the sheet by the said arm *c*⁸ passing over a fixed cam *c*¹⁰, secured to the chain-wheel studs *c*⁷. They are represented as having a closing-spring *s*, applied to the bar *c'* in the usual manner.

E is a reciprocating carriage arranged under the delivery apparatus proper, where it is supported and guided by pairs of flanged rollers *b* *b'* to run horizontally and parallel with the toothed endless racks C. The upper rollers *b* turn freely on fixed studs secured in the lower ways D and standards B'. The lower rollers *b'* turn freely on studs provided on fixed hangers *b*². In the ends of this carriage are shafts *e* *e'*, which have wheels *e*^{*} upon them for the purpose of carrying a traveler consisting of a series of endless tapes or bands *e*³, the said tapes or bands being wholly supported or operated by the said wheels. The reciprocating motion of this carriage is produced in a direction toward the delivery-table by projections *f* (see Figs. 1, 2, and 3) on the endless racks C, acting against projections *f'* secured to the carriage, and the return movement is produced by means of a winding apparatus, consisting of a cord or cords *h* attached to the rear end of the carriage, one or more pulleys *h'* for winding up said cords, and a shaft for said pulleys. In the example shown in Figs. 1 and 2 the said shaft *h*² is fitted to turn in bearings supported on the side frames of the machine, and the pulleys *h'* are fast upon it, and the said shaft is furnished with a pulley *j*, to which is attached a cord *j'*, passing over a pulley *j*² attached to the framing, the said cord having suspended from it a weight *j*³, which tends to

turn the shaft h^2 in a direction to wind up the cord h on the pulleys h' and cause them to pull the carriage back toward the cylinder. The pulley j is represented as having a convolute periphery, whereby the leverage of the weight upon the shaft h^2 and pulleys h' is diminished as the carriage approaches the cylinder, and the momentum of the carriage is reduced in such manner as to facilitate its stoppage. The cords h are guided by pulleys h^4 , supported in hangers h^5 secured under the fixed ways D.

Coiled springs h^3 might be substituted for the weight j^3 , cord j' , and pulleys j and j^2 , as illustrated by Fig. 1^{*}, which represents a sectional view of the shaft h^2 and a side view of one of the pulleys h' and one of such springs. In this case the shaft h^2 is or may be fixedly secured to the machine-framing and the pulleys h' loose on the said shaft. The springs h^3 are then upon the shaft and have one end secured to the shaft and the other end secured to the pulley, the direction and resilience of their coils being such as to turn them in a direction to wind up the cords h . I however prefer to use a weighted cord instead of a spring for winding up the cords h , especially a weighted cord on a convolute pulley j , such as is shown in Figs. 1 and 2. The tape-wheels e^* on the shaft e are fast on said shaft to be turned by it; but the shaft e' is fast in the carriage and its wheels e^* turn loosely upon it. The shaft e has firmly secured to it a ratchet-wheel e^4 , (see Figs. 4 and 5,) and has loose upon it a spur-gear e^5 , which gears with a stationary toothed rack g , provided on the under side of one of the lower stationary ways D, and which is caused to rotate by running along the said rack in either direction. The said spur-wheel e^5 carries a spring-pressed pawl e^6 , which engages with the ratchet-wheel e^4 , the teeth of which are so set that as the carriage E runs out from the cylinder toward the receiving-table and the spur-wheel is thus caused to rotate by its movement along the rack the pawl will pass over the ratchet-teeth without turning the ratchet-wheel or shaft e , and without moving the tapes in the carriage; but as the carriage runs back toward the cylinder and the wheel e^5 is turned in the opposite direction the pawl engages with the ratchet-wheel and turns it and the shaft to give the tapes such a progressive movement in the carriage that their upper parts move in the opposite direction to that in which the carriage moves. The tape-wheels and the gear-wheel e^5 are so proportioned that the movement of the tapes within the carriage is at the same speed as the movement of the carriage itself.

To provide for stopping the carriage E in its return movement in a proper position to receive the sheets from the delivery-grippers and for effecting this stoppage without shock, I provide yielding stops on the stationary framing of the machine.

I will now proceed to describe one of the

stops which I have employed for the purpose, and which are arranged one on each side of the machine. This stop is fully represented in Figs. 5 and 6, Fig. 5 being a view looking crosswise of the machine, and Fig. 6 being a view at right angles to Fig. 5.

F is a rigid hanger secured to one of the stationary ways D and containing the bearing for a short axle i of a disk i' , which carries a pin i^2 , which I call the "arresting-pin." The axle i has coiled around it a spring i^3 , one end of which is secured to the axle and the other end to the hanger, and which exerts a constant tendency to turn the axle and the disk in the direction of the arrow represented on the disk in Fig. 5, as far as permitted by the stop-pin i^4 , which, by the action of said spring i^3 , is brought against the hanger in the position shown in dotted outline in Fig. 5. When the pin is in that position, the arresting-pin i^2 is in the position shown in dotted outline in Fig. 5. When the carriage is drawn back by the cords h , it comes in contact with the arresting-pin i^2 in the last-mentioned position and turns the said pin and the disk in the opposite direction in which the spring i^3 tends to turn it, and the spring is thus caused to be so coiled up that its resilience or tension is gradually increased, and thereby caused to give an increasing resistance to the carriage until the said pin arrives in the position in which it is represented in bold outline in Fig. 5, beyond which it cannot be pushed by the carriage. By the time the pin and carriage arrive in this position the momentum of the carriage has been gradually overcome, and the stoppage of the carriage is therefore effected without shock.

The operation of my invention is as follows: The sheet being taken from the cylinder by the grippers is carried toward the receiving-table by the movement of the grippers with the chains, and is brought over the carriage E, which, and its stops, are then stationary. When the sheet has been brought to a proper position over the carriage, the grippers are opened by their arm c^8 coming in contact with the cam c^{10} , and the sheet then drops on the tapes or traveler of the carriage, which is at that moment caused to move forward by the projections f on the endless racks coming in contact with the projections f' on the carriage. This forward movement is continued until the carriage arrives with the sheet over the receiving-table. The projections f on the chains are then by passing upward to pass over the chain-wheels drawn clear of the projections f' on the carriage, which is then left free to be returned by the cords h , pulleys h' , and springs h^3 . During this return of the carriage the upper parts of the tapes or traveler will be caused to move in the opposite direction at the same speed as the carriage itself moves, and in that way the sheet will be caused to be left behind by the carriage and allowed to fall on the receiving-table.

In order to permit the backing of the cylinder and delivery apparatus, when necessary, without any obstruction by the projections f' on the carriage E to the driving projections f on the endless racks or chains, the said projections are constructed of spring-steel in the form of tongues, and are secured at their front ends to the carriage by screws f^2 , (see Fig. 1,) with their rear ends against which the driving projections f act, projecting inward, as shown in Fig. 2, some distance clear of the inside of the carriage. In running the cylinder and the racks or chains backward the tongues f' will yield to the pressure of the projections f and allow the latter to pass by.

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

1. The combination, with an impression-cylinder, a delivery apparatus, a receiving-table, and a reciprocating carriage deriving its movement toward the table from the delivery apparatus, of a winding apparatus, and means, substantially as herein described, for actuating said winding apparatus to effect the return of the said carriage, substantially as herein set forth.

2. The combination, with an impression-cylinder, a delivery apparatus consisting of endless racks or chains and attached grippers, a receiving-table, a reciprocating sheet-carriage, and a projection on said delivery apparatus for moving said carriage toward the receiving-table, of a winding apparatus, and means, substantially as herein described, for turning the same for returning said carriage, substantially as and for the purpose herein set forth.

3. The combination, with an impression-cylinder, a delivery apparatus, and a receiving-table, and a reciprocating carriage moved toward the receiving-table by the direct action upon it of the delivery apparatus and provided with a traveler for receiving the sheet, of a winding apparatus, and means, substantially as herein described, for actuating the same to return said carriage, said traveler being stationary in the carriage during the movement of the latter toward the table, but having a progressive movement therein during the return movement, substantially as herein set forth.

4. The combination, with the impression-cylinder, a delivery apparatus, and a receiving-table, of a reciprocating sheet-carriage positively moved toward the receiving-table and weight actuated for its return, and a yielding stop to arrest the return, substantially as herein set forth.

5. The combination, with an impression-cylinder, a delivery apparatus, a receiving-table, a reciprocating sheet-carriage provided with an endless traveler and deriving its movement toward the receiving-table from the delivery apparatus, and means, substantially as herein described, for returning the said carriage, of a ratchet-wheel on one of the carrying-shafts of the traveler for giving the latter a forward movement in the carriage during the return movement of the latter, a spur-gear on the said shaft, and a pawl carried thereby and engaging with the ratchet-wheel, and a stationary rack in which the spur-gear runs as the carriage is moved back and forth by the delivery apparatus, all substantially as and for the purpose herein set forth.

6. The combination, with the reciprocating sheet-carriage and means, substantially as herein described, for returning the same, of the yielding stop consisting of a disk having an arresting-pin on one face, an axle for said disk, and a fixed support for the same, and a spring applied to said disk to turn its stop-pin toward the carriage and produce resistance by which to gradually stop the carriage, substantially as herein set forth.

7. The combination, with an impression-cylinder, a delivery apparatus, a receiving-table, and a reciprocating sheet-carriage deriving its movement toward the receiving-table from the delivery apparatus, of a shaft, pulleys, one of which is of convolute form on said shaft, a cord connecting one of said pulleys with the carriage, and a weight connected with another of said pulleys to produce the return of the carriage, substantially as herein set forth.

8. The combination, with the impression-cylinder, an endless delivery apparatus, and a reciprocating carriage for receiving the sheets from the said delivery apparatus, of a projection on the delivery apparatus, and a projection on the said carriage for driving the carriage forward or away from the cylinder by the delivery apparatus, one of said projections being yielding, substantially as herein described, to allow the one on the delivery apparatus to pass by that on the carriage during the movement of the delivery apparatus in the reverse direction, as herein set forth.

CALVERT B. COTTRELL.

Witnesses:

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