

(No Model.)

2 Sheets—Sheet 1.

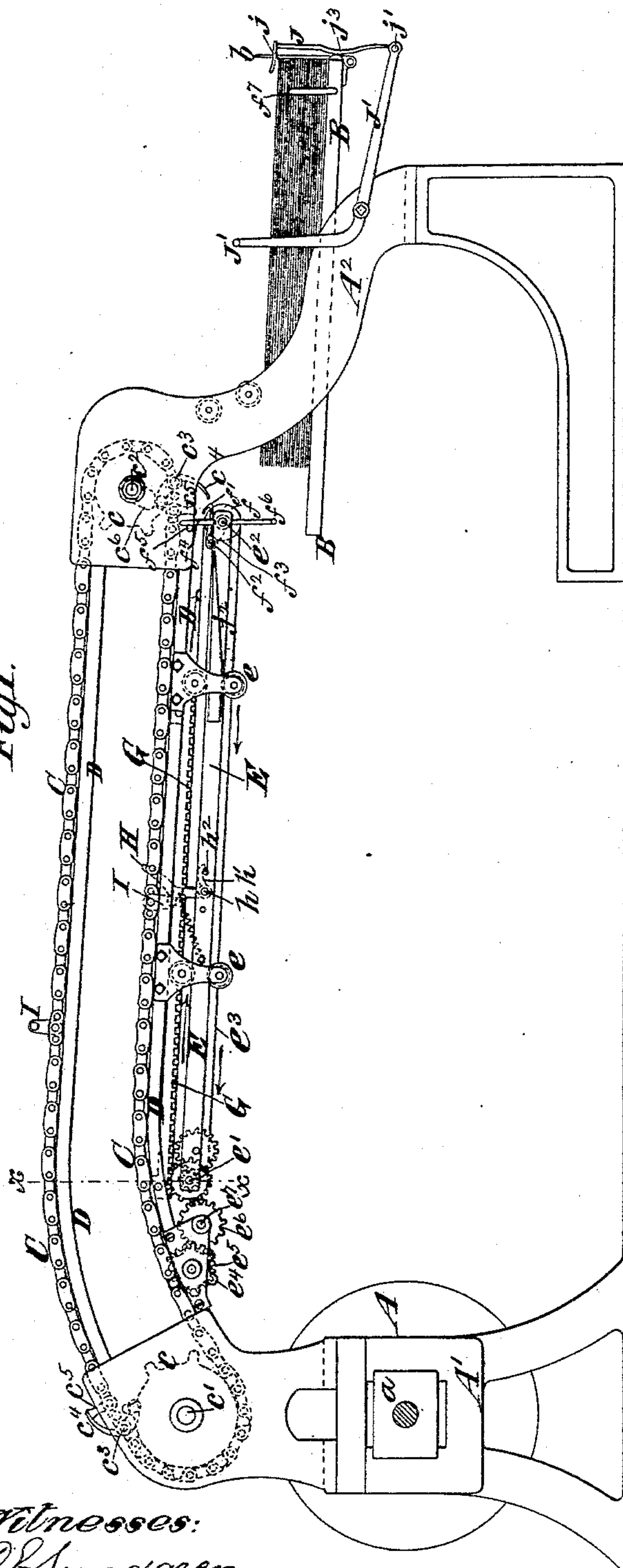
C. B. COTTRELL.

SHEET DELIVERY APPARATUS FOR PRINTING MACHINES.

No. 387,768.

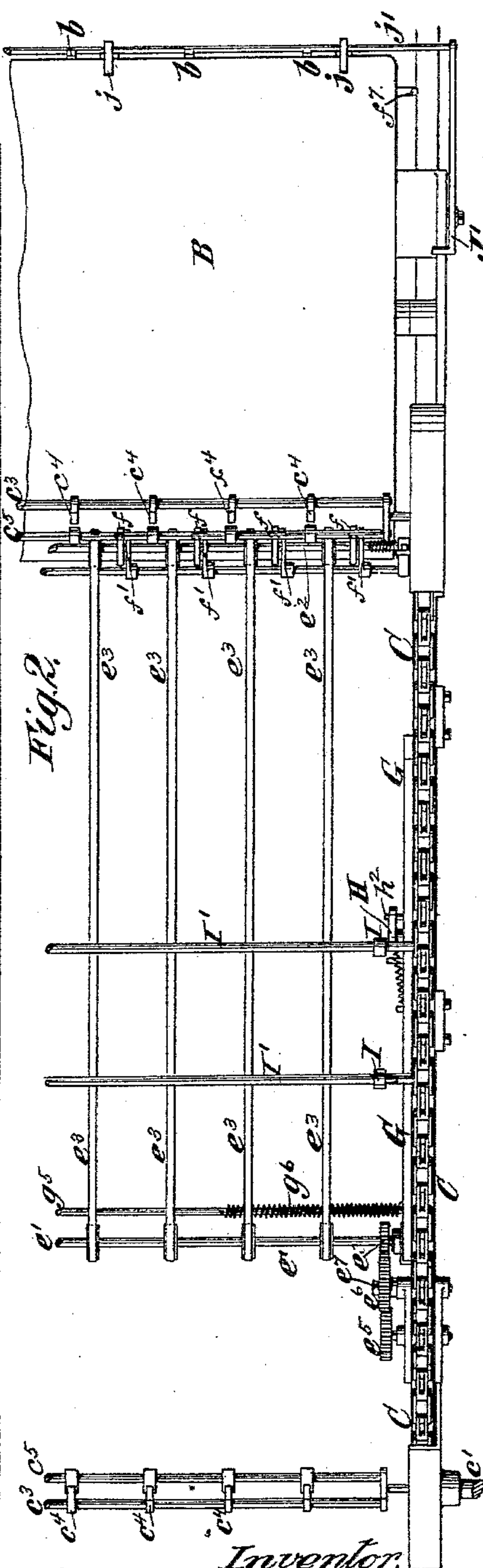
Patented Aug. 14, 1888.

Fig. 1.



Witnesses:
O. Sundgren,
Henry J. McBride,

Fig. 2.



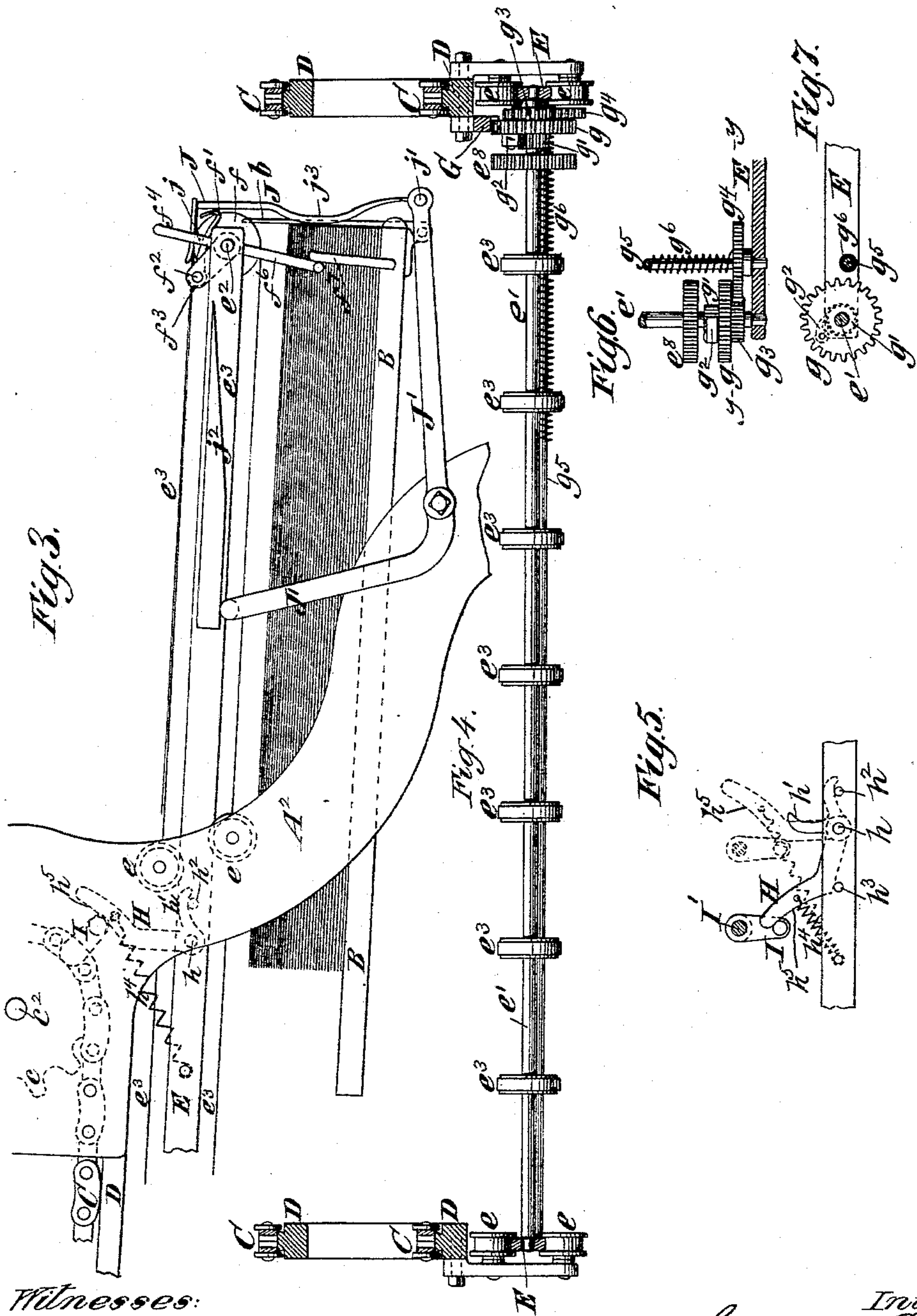
Inventor.
Calvert B. Cottrell,
by his attys
Brown & Hall.

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UNITED STATES PATENT OFFICE.

CALVERT B. COTTRELL, OF STONINGTON, CONNECTICUT.

SHEET-DELIVERY APPARATUS FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 387,768, dated August 14, 1888.

Application filed January 12, 1888. Serial No. 260,507. (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 Sheet-Delivery Apparatus for Printing-Machines, of which the following is a specification.

My invention relates to a printing machine in which is employed a front delivery apparatus and a receiving-table at the farther end of the machine; and in carrying out my invention I now prefer to employ a front delivery apparatus composed of two endless chains or travelers carrying one or more sets of delivery-grippers between them, as is shown in my Letters Patent No. 319,460, dated June 9, 1885, and I shall illustrate and describe my invention as combined with such a delivery apparatus.

In carrying out my invention I employ, in connection with the impression-cylinder, receiving-table, and front delivery apparatus, a reciprocating carriage provided with tape-rollers and with endless tapes, on which the printed sheet is deposited by the delivery apparatus, and by the forward movement of the carriage the sheet is carried to the receiving-table.

The invention will be particularly herein-after described, and then pointed out in the claims.

In the accompanying drawings, Figure 1 is a side view of such parts of a machine as are necessary to illustrate my invention. Fig. 2 is a plan of one side portion of the machine, the other side portion being similar. Fig. 3 is a side view of the receiving-table and a portion of the tape-carriage with their appurtenances. Fig. 4 is a transverse section on a larger scale and on the plane of the dotted line xx , Fig. 1. Fig. 5 is a side view of a part of the tape-carriage and the tappet-arm for operating it. Fig. 6 is a plan of a part of the tape-carriage. Fig. 7 is a section on the plane of the dotted line yy , Fig. 6. Figs. 3, 4, 5, 6, and 7 are all upon a larger scale than the preceding figures, and in all the figures corresponding parts are designated by the same letters of reference.

A designates the impression-cylinder, journaled in boxes a in cylinder-frames A' , and at

the farther or front end of the machine is a receiving-table, B, supported by stands or frames A^2 . Both the cylinder-frames A' and the stands A^2 rise from the side frames of the machine. (Not here shown).

The delivery apparatus may be very similar to that shown in my above-referred-to Letters Patent, save that, as it is not itself required to carry the sheet to so great a distance from the cylinder, it may be made shorter.

C designates two parallel end endless delivery chains or travelers having extending between them one or more sets of delivery-grippers and supported by chain-wheels c on two shafts, c' c^2 , the first journaled in upward prolongations of the cylinder-frames A' and the second supported by the stands A^2 . The chains are supported by tracks or ways D in their upper and lower travel. Two sets of delivery-grippers are here shown as arranged equidistant from each other in the length of the chains. Each set may consist of a gripper-bar, c^3 , having fingers or grippers c^4 and a rest-bar, c^5 .

Instead of extending the delivery apparatus so as to deposit the printed sheet on the table B, I provide a reciprocating tape-carriage, E, on which the sheet is deposited and carried to the table. This carriage is guided, as here shown, by pairs of rolls or wheels e in brackets depending from the tracks or ways D, and journaled in its ends are shafts e' e^2 , which have wheels upon them and constitute tape-rollers. Over these tape-rollers e' e^2 pass or on them are carried simple endless tapes or bands e^3 , which pass around the rollers and directly between them, such tapes being wholly supported and operated by the rollers.

When a printed sheet is being withdrawn from the cylinder, the carriage E is at rest in its inner or backward position, as shown in Fig. 1, and as the sheet is drawn forward upon the tapes e^3 the tapes should have a progressive movement or travel, as shown by the arrows in Fig. 1, so that the sheet shall not drag upon them. The gearing here shown for this purpose consists of a chain-wheel, e^4 , gearing into one of the delivery-chains C, a wheel, e^5 , on the same shaft therewith, and a second wheel, e^6 , on a stud, e^7 , and driven by the wheel e^5 . On the tape-roller shaft e' is a wheel,

e^8 , which comes into gear with the wheel e^6 when the carriage E is at rest and receives motion therefrom to drive the tapes e^3 in the required direction. As soon, however, as the carriage E commences its forward movement, the wheel e^8 is removed from the wheel e^6 , and the tapes remain motionless relatively to the carriage driving the forward movement of the latter.

At the forward end of the carriage E, I provide a gripper, (best shown in Fig. 3,) for grasping the front edge of the sheet. On the front shaft, e^2 , are a number of paper-supporting wheels or disks, f , and adjacent to these are hooked gripper-fingers f' , carried by a bar, f^2 . This bar is supported by arms f^3 , hung loosely on the shaft e^2 . The arms f^3 also have upwardly-extending arms f^4 , and when the carriage is at rest, as shown in Fig. 1, these arms f^4 are against stop-pins f^5 , which hold the bar f^2 in an elevated position with the hooked gripper-fingers f' above the periphery of the disks or wheels f . As the chains C bring their delivery-grippers to the end of their travel, they are opened by the cam e^6 , and the sheet falls upon the tapes e^3 , and is by their progressive movement carried slightly forward, so that its front edge passes into the hooks of the grippers or fingers f' . As the carriage commences its forward movement, the arm f^4 leaves the stop-pin f^5 and the bar f^2 falls slightly, causing the hooked grippers f' to hold the front edge of the sheet tightly upon the rest wheels or disks f .

Loose upon the shaft of the tape roller e' is a gear-wheel, g , which is always in gear with a stationary rack, G, extending parallel with the line of movement of the carriage E. It has a clutch-connection with said shaft, so that the shaft may be rotated by the wheels e^5 e^6 e^8 without turning the wheel g , and so that the wheel g may turn during the forward movement of the carriage without turning the shaft e' , but so that as the wheel g turns during the inward or backward movement of the carriage it will turn said shaft and move the tapes. The clutch here shown consists of a ratchet-wheel, g' , fast on the shaft e' , and a pawl, g^2 , on the wheel g , as shown in Fig. 7.

Fast to the wheel g is a small pinion, g^3 , gearing into a wheel, g^4 , loose on a shaft or rod, g^5 , extending across the carriage E. On the shaft g^5 is a spring, g^6 , one end of which is fast in the shaft, and the other end of which is fast in the wheel g^4 . Consequently as the carriage moves forward the wheel g is turned by rolling on the rack G, and without imparting any turning movement to the shaft e' it turns the wheel g^4 and winds up the spring g^6 for a purpose soon to be described. As here shown, the carriage E is moved forward by the action of the delivery-chains C.

H designates a lever pivoted at h to the carriage, and having a toe, h' , which, when the lever is raised, strikes a stop-pin, h^2 . At all other times said lever is drawn down upon a stop-pin, h^3 , by a spring, h^4 , as shown in Fig.

5, so as to be below and out of reach of the gripper-bars extending between the chains C, as before described.

I designates a tappet-arm which extends between the chains C and depends from a cross-bar, I', so as to come in the path of the lever H. As I have shown two sets of delivery-grippers on the chains C, I have shown two tappet-arms, I, arranged at such exact distance behind the sets of grippers that at the instant one set of grippers on the chains C are opened by the action of the cam e^6 the following tappet-arm I has raised the lever H to the active position shown by dotted lines in Fig. 5, and as the sheet drops onto the tapes e^3 the carriage E moves forward by the action of the tappet-arm I, the tapes meanwhile being motionless in the carriage.

At the forward end of the receiving-table B are sheet-eveners b , and also nippers J, having jaws or forks j , into which the front edge of the sheet enters as the carriage comes forward, and which take a slight hold on the sheet. These nippers rise from a bar, j' , which is hung in levers J', one at each side of the machine, and on the carriage E, at each side, is an inclined cam, j^2 . As the carriage comes forward, the action of the cams j^2 on the levers J' raises the nippers J to the level of the sheet, and as the front edge of the sheet passes into the jaws or forks of the nippers the downwardly-depending arms f^6 on the arms f^3 of the carriage come against stops f^7 on each side of the table B, and thereby raise the arms g^3 and bar g^2 , thus moving the hooked fingers or grippers f' out of engagement with the edge of the sheet. As the carriage E moves rearward, the cams j^2 leave the levers J', and the nippers J fall to the position shown in Fig. 1 from the position shown in Fig. 3. The nippers J are bowed, as shown at j^3 , and as they descend such projections j^3 bear on the edge of the table and draw the nippers forward and away from the edge of the sheet, which is arrested by the sheet-eveners b and drops squarely upon the pile on the table B.

The lever H is shown as having a cam or curved surface, h^5 , (see Fig. 5,) and as the tappet-arm I reaches the shaft e^2 it dwells for an instant on this curve as the chains C round the wheels c , and holds the carriage E momentarily stationary. As the arm H is released, the spring g^6 , which has been wound up during the forward movement of the carriage, asserts itself, and through the wheel g and rack G moves or draws the carriage inward, the wheel g meanwhile, through the pawl g^2 , engaging the ratchet-wheel g' on the shaft e' , producing the progressive travel of the tapes e^3 , so as to cause their upper portions to move forward at the same speed that the carriage moves rearward. This enables the carriage to move out from under the printed sheet and drop it squarely on the pile.

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

1. The combination, with an impression-cyl-

inder and front delivery apparatus and a receiving-table at the farther end of the machine, of a reciprocating carriage provided at opposite ends with tape-rollers and endless tapes on which the printed sheet is deposited by the delivery apparatus, said tapes passing around and directly between said rollers, and being wholly supported and moved by the rollers, and having a progressive movement during the return movement of the carriage toward the cylinder, whereby their upper sheet-supporting portions are moved forward toward the table at the same speed that the carriage is moving toward the cylinder, substantially as herein described.

2. The combination, with an impression-cylinder and front delivery apparatus and a receiving-table at the farther end of the machine, of a reciprocating carriage provided at opposite ends with tape-rollers and endless tapes on which the printed sheet is deposited by the delivery apparatus passing around and directly between the tape-rollers, by which they are wholly supported and moved, said tapes having a progressive movement carrying their upper portions toward said table while receiving the sheet upon them and a corresponding movement while the carriage makes its return movement toward the cylinder, but being motionless on their rollers during the forward movement of the carriage toward said table, substantially as herein described.

3. The combination, with an impression-cylinder, a receiving-table at the farther end of the machine, and a front delivery apparatus composed of endless chains or travelers having one or more sets of grippers between them, of a reciprocating carriage provided with tape-rollers and endless tapes, gearing whereby a progressive travel of the tapes to carry their upper portions toward the said table is produced while the carriage is at rest in its inner position, a tappet on the delivery chains or travelers for engaging said carriage and moving it forward after the delivery of the sheet upon its tapes, a stationary rack, and a wheel en-

gaging said rack and imparting a progressive movement to the tapes during the return movement of said carriage, substantially as herein described.

4. The combination, with an impression-cylinder, A, the receiving-table B, and the delivery-chains and their grippers, of the tape-carriage E, having tape-rollers and endless tapes and guided below said chains, the lever H, pivoted to the carriage, and a spring for drawing it down out of reach of the delivery-grippers, and the tappet-arm I, carried by said chains for acting upon said lever to move the carriage forward, substantially as herein described.

5. The combination, with the cylinder A, the receiving-table B, and the delivery-chains C, with their grippers, of the reciprocating carriage E, provided with tape-rollers and endless tapes, the stationary rack G, parallel with the line of movement of said carriage, gears operated by the delivery-chains and through which a tape-roller and the tapes are operated when the carriage is at rest in its inner or rearward position, a spring on the carriage, and gears, one of which engages said rack and has a clutch-connection with a tape-roller shaft, whereby said gear will be rotated to put the spring under tension during the forward movement of the carriage and will be rotated by the spring to draw the carriage along the rack, and thus produce its backward movement and the simultaneous forward travel of the tapes, substantially as herein described.

6. The combination, with a receiving-table and receiving-nippers at its front and a lever connected with said nippers for raising and lowering them, of a reciprocating tape-carriage having a cam for acting on said lever to raise the nippers during the forward movement of the carriage, substantially as herein described.

CALVERT B. COTTRELL.

Witnesses:

FREDK. HAYNES,
JOS. W. ROE.