(No Model.) 2 Sheets—Sheet 1.

C. B. COTTRELL.

DELIVERY APPARATUS FOR PRINTING PRESSES.

No. 319,458. Patented June 9, 1885.

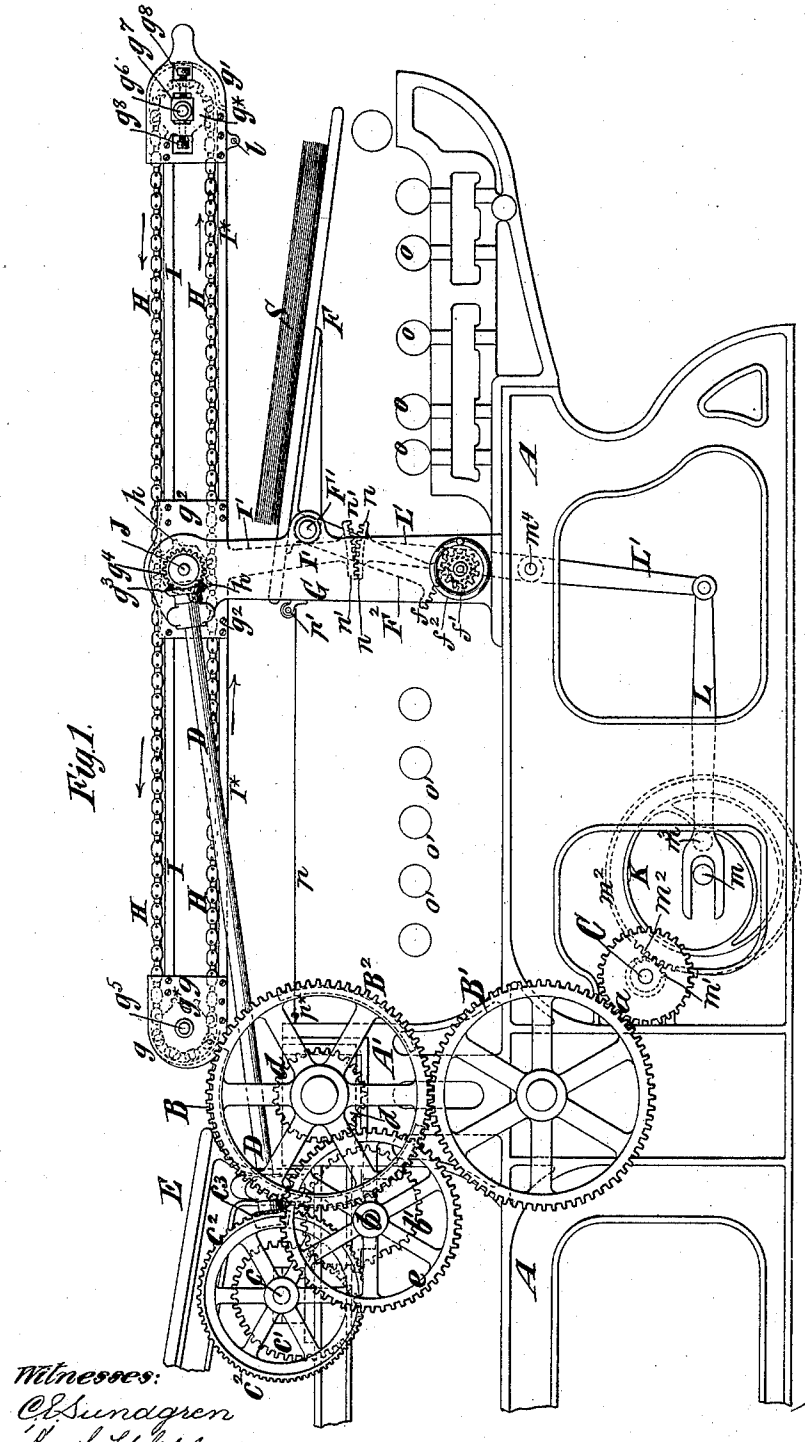


Fig. 1.

Witnesses:
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Louis M. J. Whitehead.

Inventor:
Calvert B. Cottrell
by his Attys.
Brown & Hall

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

C. B. COTTRELL.

DELIVERY APPARATUS FOR PRINTING PRESSES.

No. 319,458. Patented June 9, 1885.

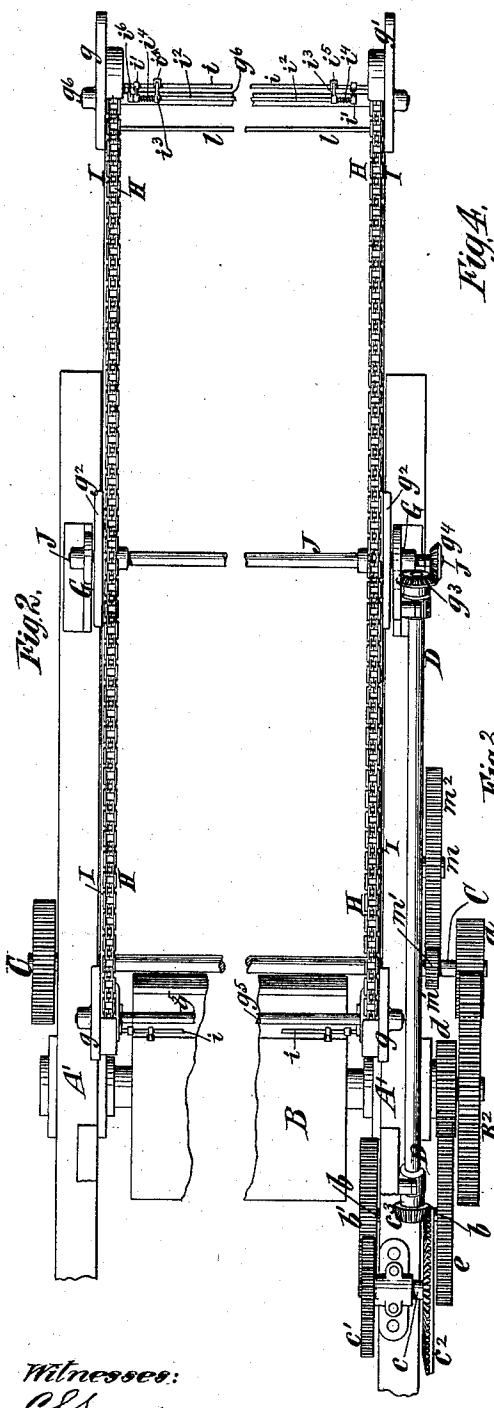


Fig. 2.

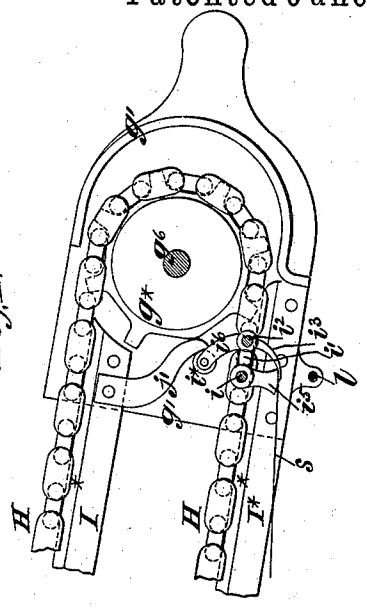


Fig. 4.

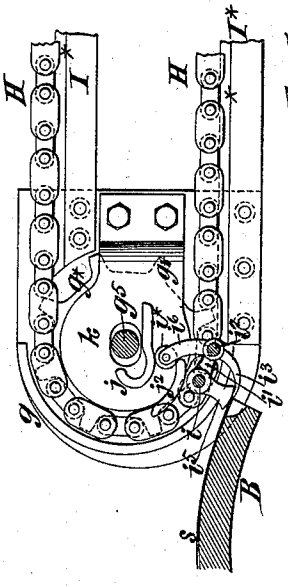


Fig. 3.

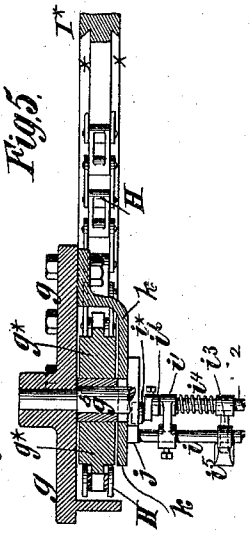


Fig. 5.

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UNITED STATES PATENT OFFICE.

CALVERT B. COTTRELL, OF STONINGTON, CONNECTICUT.

DELIVERY APPARATUS FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 319,458, dated June 9, 1885.

Application filed June 18, 1884. (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-Presses, of which the following is a specification.

My invention relates to front-delivery apparatus whereby the printed sheets are taken from the front of the impression-cylinder and are carried over the inking apparatus to a receiving-table at the farther end of the press, whereon they are deposited, printed side up.

The invention is applicable more particularly to presses in which the delivery-grippers are carried and moved by an endless carrier composed of two endless chains connected by a gripper-bar extending between them and a gripper-shaft or rod provided between them with gripper-fingers, said endless carrier having an accelerated and retarded movement continuously in one direction, whereby it is caused to carry the printed sheets quickly from the cylinder to the receiving-table and over the inking apparatus, and is slowed down to deliver the printed sheets upon the receiving-table.

My invention consists in the combination, with the impression-cylinder and receiving-table, of an endless carrier provided with delivery-grippers arranged at the front of the cylinder and having an alternately accelerated and retarded movement, and tracks or ways for said carrier pivoted between their ends and having a tilting movement in a vertical plane.

The invention also consists in the combination, with the aforesaid impression-cylinder, endless carrier, and tracks or ways having a rising and falling movement at their outer ends, of a pivoted receiving-table capable of adjustment at different angles of inclination to better enable it to properly receive and hold the printed sheets.

The invention also consists in the combination, with the aforesaid impression-cylinder, of a receiving-table at the farther end of the press, an endless carrier provided with delivery-grippers, and tracks or ways for said carrier having a rising and falling movement at their outer ends, said tracks or ways being provided with a stop or bearer adapted to descend with the tracks or ways and to come to a bearing on the pile of printed and delivered sheets, whereby the falling movement of the tracks or ways is made to conform to the increasing height of the pile of printed sheets.

The invention also consists in the combination, with an impression-cylinder, a receiving-table at the farther end of the press, endless chains connected by a gripper-bar, and a rod provided with delivery-grippers and tracks or ways for said chains provided at their ends with wheels for said chains, of driving-wheels engaging with the lower portions of said chains forward of the cylinder and serving to move the chains continuously in one direction and to exert a tension or pulling force on the lowermost portions of the chains, whereby the delivery-grippers are caused to take the printed sheet from the cylinder without shock or jar owing to lost motion and wear in the links of the chain. The aforesaid driving-wheels, which engage with the chains forward of the cylinder, are preferably arranged to engage with and drive both the upper and lower portions of the chains.

In the machine here chosen to illustrate my invention the upper and lower portions of the endless chains are supported by tracks or ways pivoted between their ends, so as to have a tilting motion, serving to raise and lower their ends alternately. Chain-supporting wheels are provided at the ends of the tracks or ways, and concentric with their pivotal centers are chain-driving wheels, whereby the chains are moved, and to which an alternately accelerated and retarded rotary motion is imparted, whereby a corresponding progressive movement is given the chains.

In the accompanying drawings, Figure 1 represents a side elevation of such parts of a two-revolution press as are necessary to illustrate my invention. Fig. 2 is a plan thereof, portions being broken away to reduce the width of the drawings. Figs. 3 and 4 are detail views upon a larger scale, illustrating portions of the endless chains and tracks or ways, Fig. 3 showing the delivery-grippers in position to take a sheet from the cylinder, and Fig. 4 showing the grippers in position to deliver the printed sheet; and Fig. 5 is a section

in a horizontal plane and on the same scale as Figs. 3 and 4, illustrating a portion of an endless chain, its tracks or ways and the grippers carried by it.

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

A designates the main side frames, and A′ the cylinder frames, wherein is journaled the cylinder B.

As here shown, C designates the driving-shaft, from which motion is transmitted by a pinion, *a*, and through spur-wheels B′ B² to the cylinder B.

Behind the cylinder are two short shafts, *b c*, geared together by cam-shaped gear-wheels *b′ c′*. A continuous and uniform rotary motion is imparted to the shaft *b* by means of a pinion, *d*, on the cylinder-shaft engaging with a wheel, *e*, on the shaft *b*, and by means of the cam-shaped wheels *b′ c′* a variable rotary motion, alternately accelerated and retarded, is imparted to the shaft *c*. Upon the shaft *c* is a large bevel-wheel, c^2, and the variable rotary motion is transmitted therefrom through a bevel-pinion, c^3, to a diagonal shaft, D, for a purpose hereinafter described. The construction and operation of cam-shaped gear-wheels similar to *b′ c′* is fully set forth in my application for Letters Patent filed January 28, 1884, and of which the serial number is 118,908, and no further description thereof is here necessary.

E designates the feed-board, arranged behind and slightly above the cylinder, and at the farther end of the press is a receiving-table, F, which, as here shown, is pivoted at or near its rear end. The pivots or journals of the receiving-table F are formed by a rock-shaft, F′, mounted in bearings in standards G, at opposite sides of the press, and the rock-shaft has an attached arm, F^2, provided at the lower end with a sector-gear, *f*, with which engages a pinion, *f′*, capable of being turned by a hand-wheel, f^2. By turning the pinion the table may be raised or lowered, and by means of a ratchet-wheel on the same shaft with the pinion and a pawl on the standard G the table may be held at any desired degree of inclination to which it is adjusted.

The mechanism for raising and lowering the tilting or pivoted table F is the same as that shown and described in my aforesaid application for patent, and no further description thereof is here necessary.

H designates endless chains, which may be of any suitable construction, and two of which are employed, one being arranged at each side of the press. These endless chains are connected by a gripper-bar, and between them are arranged, at short distances apart, delivery-grippers for taking the printed sheets from the cylinder to the receiving-table. The system of grippers here shown and their mode of operation will be soon described.

To properly guide the endless chains H, I provide upper and lower tracks or ways, I I*, for each chain. The tracks or ways of each pair are connected at the ends by hoods or housings *g g′*, and between their ends by plates g^2, and in the plates g^2 is a transverse shaft, J, carrying chain-wheels *h*, which in this example of my invention engage both the upper and lower members of the chains and impart to them a movement continuously in one direction, the uppermost portions of the chains always moving toward the cylinder, and the lowermost portions of the chains always moving away from the cylinder, as indicated by the arrows, Fig. 1.

The diagonal shaft D is geared with the transverse shaft J by bevel-wheels g^3 g^4, and hence the alternately accelerated and retarded rotation of the shaft D is imparted to the shaft J and chain-wheels *h*, and correspondingly variable progressive movement is produced in the chains H.

In order that the printed sheets may be the better delivered upon the receiving-table F, the tracks or ways I I* have a rising and falling movement at their outer ends, and in this example of my invention this movement is obtained by pivoting the tracks or ways between their ends, so that they are capable of swinging or oscillating in a vertical plane. The shaft J is concentric with the center of oscillation, and is supported in the standards G.

At the ends of the tracks or ways and journaled in the housings or frames *g g′*, are shafts g^5 g^6, carrying idler-wheels or chain-wheels g^* g^*, whereby the chains H are supported, and to take up slack produced by wear or otherwise the boxes or bearings g^7 of the shaft g^6 may be adjusted in the housings *g′* by means of screws g^8, in a well-known manner.

From the above it will be understood that the two pairs of tracks or ways, their end frames or housings, and the endless chains all form a single structure capable of tilting in a vertical plane, and that the shafts D J and gearing above described transmit the desired progressive movement to the chains during the tilting movement of the tracks or ways.

In order to catch any oil which may be carried to the tracks or ways by the chains, the tracks or ways may be provided in their sides with inclined or angular gutters *, as shown in Fig. 5, and the oil is thereby prevented from dropping on the form.

The construction and arrangement of the delivery-grippers and their mode of operation will be best understood from Figs. 3, 4 and 5, it being understood that the cylinder is provided with suitable cylinder-grippers of any well-known construction, operated in any suitable manner.

The chains H H are connected by a non-rotary gripper-bar, *i*, and as with the gearing here shown the chains are to make two deliveries at each complete circuit they are connected by two such non-rotary bars at equidistant parts in their length. A description of one bar and set of grippers will apply to both.

Near each end of the gripper-bar *i* are fixed

arms i', in which is journaled a rocking gripper shaft or rod, i^2, on which are secured, at short distances apart, gripper-fingers or grippers i^3, and to one or each end of the gripper shaft or rod i^2 is applied an ordinary gripper-closing spring, i^4, whereby said shaft or rod is turned to close all the grippers simultaneously upon gripper rests or pads i^5, fixed upon the gripper-bar i.

At the end of the gripper shaft or rod i^2 is an arm, i^6, provided with a roller, i^*, and as the grippers are moved along by the chains this roller i^* bears, first, upon a cam, j, adjacent to the cylinder, and whereby the grippers are opened to take the printed sheet, and, secondly, upon a cam, j', attached to the upper track or way, I, at its opposite end, as shown in Fig. 4, whereby the grippers are opened to deliver the printed sheet.

A bracket or arm, k, secured to the end frame or housing, g, as shown in Fig. 5, serves to support the cam j, and immediately below the cam j is a second cam, j^2, which acts upon the roller i^* to positively close the grippers upon the printed sheet in case that office is not performed quickly enough by the gripper-closing spring i^4.

As shown in Fig. 3, the grippers i^3 have just closed on the printed sheet s, and, as shown in Fig. 4, the roller i^* has just been brought to the cam j', and the grippers are just about to be opened to deliver the sheet s. The position of the cam-shaped gear-wheels b' c' shown in Fig. 1 corresponds to the position of the grippers shown in Fig. 3, and at this time the endless chains should have a speed which will give the delivery-grippers a movement equal to the surface velocity of the cylinder. As the printed sheet is taken from the cylinder, the chains move quickly to carry the printed sheet over the form, and as the sheet approaches the receiving-table F the chains are slowed down or retarded to facilitate the depositing of the sheet on the pile S upon said table.

The ends of the tracks or ways adjacent to the cylinder must come to a definite point in their falling movement in order that the delivery-grippers may take the sheets from the cylinder with proper precision; but I prefer that the outer ends of the tracks or ways shall have a variable falling movement which will decrease with the increased number of sheets upon the pile S.

As here shown, a wire or small rod, l, connects the pairs of tracks or ways, and as the latter fall at their outer ends they bring this wire or rod l down upon the pile S, near the edge thereof. The said wire or rod therefore forms a stop or bearer to limit the falling movement of the tracks or ways, and the latter are made heavy enough or weighted at their outer ends, so as to descend automatically when allowed to do so. The mechanism for actuating the tracks or ways is therefore of such a nature as to raise the tracks or ways from an inclined position to that shown in Fig. 1, and to regulate but not to limit their movement from that position to an inclined position. As here shown, this mechanism comprises a cam, K, mounted on a shaft, m, and receiving motion through a pinion, m^2, from the shaft C, a rod, L, carrying a roller, m^3, which bears on the inner periphery of the cam K, a lever, L', fulcrumed at m^4, and having its lower end connected with the rod L and its upper end provided with a sector or segment gear, n, engaging with a similar sector or segment, n', on an arm, I', projecting downward from one of the side plates, g^2, connecting the tracks or ways I I*.

I have here made an arbitrary illustration of inking-rollers o and distributing-rollers o'; but have not shown the bed, as my invention does not relate thereto.

In order to protect the form and inking apparatus against anything falling upon it from the sheet-delivery apparatus, I have shown a shield or guard, p, as arranged below the delivery apparatus. This may consist of a simple curtain and a spring-actuated curtain-roller, p', supported by the standards G. When the press is in operation, the shield or guard p may be extended and secured at p^*; but when access is desired to the form the shield or guard may be allowed to roll upon the roller p'.

The pivoted or tilting receiving-table in connection with the tilting tracks or ways is desirable, because the inclination of the table may be varied to secure the best results. It is of advantage to have the chain-wheels, which move the endless chains, located forward of the cylinder ends of the tracks or ways and in engagement with the lowermost portions of the chains, because the lowermost portions of the chains are then operated with a pull-away from the cylinder, and all wear is taken up; hence there is no liability of the delivery-grippers jumping as they take the sheet, as they might do when the portions of chain in front of them being pushed ahead instead of pulled ahead, as in my invention.

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

1. The combination, with an impression-cylinder and a receiving-table at the farther end of the press, of an endless carrier provided with delivery-grippers arranged at the front of the cylinder and having an alternately accelerated and retarded movement, and tracks or ways for said carrier pivoted between their ends and having a tilting movement in a vertical plane, substantially as and for the purpose herein described.

2. The combination, with an impression-cylinder and an endless carrier provided with delivery-grippers arranged at the front of the cylinder, of tracks or ways supporting said carrier and having a rising and falling movement at their outer ends, and a pivoted receiving-table arranged at the farther end of the press and capable of adjustment to vary its inclination, substantially as and for the purpose herein described.

3. The combination of the cylinder B, endless chains H, provided with delivery-grippers, upper and lower tracks or ways, I I*, pivoted between their ends, having a tilting movement, and provided at their ends with wheels for supporting said chains, and the pivoted and adjustable receiving-table F, substantially as herein described.

4. The combination, with an impression-cylinder and receiving-table arranged as described, of an endless carrier provided with delivery-grippers and arranged at the front of the cylinder, tracks or ways for said carrier having a rising and falling movement at their outer ends, and a stop or bearer carried by the outer ends of the tracks or ways and adapted to come to a bearing upon the pile of sheets to limit said falling movement of the tracks or ways, substantially as and for the purpose herein described.

5. The combination, with an impression-cylinder and receiving-table B F, of endless chains provided with delivery-grippers and arranged at the front of the cylinder, tilting tracks or ways for said endless chains provided at their ends with wheels for supporting said chains and pivoted between their ends, and a cross-rod, *l*, extending between said tracks or ways and arranged to come to a bearing on the pile of printed sheets to arrest the movement of said tracks or ways, substantially as and for the purpose herein described.

6. The combination, with an impression-cylinder and receiving-table arranged as described, of endless chains provided with delivery-grippers arranged at the front of the cylinder, tracks or ways provided at both ends with wheels for supporting said chains, and chain-driving wheels independent of said supporting-wheels engaging with the lowermost portions of the chains forward of the cylinder and serving to move the latter by a pulling force or tension continuously away from the cylinder, substantially as and for the purpose herein described.

7. The combination, with an impression-cylinder and receiving-table arranged as described, of endless chains provided with delivery-grippers arranged at the front of the cylinder, tracks or ways for said chains provided at their ends with supporting-wheels for the chains, and rotary driving-wheels arranged between and engaging with the upper and lower portions of the chains between the ends of said tracks or ways, substantially as and for the purpose herein described.

8. The combination, with the cylinder B and receiving-table F, of the endless chains H, provided with delivery-grippers, the tilting tracks or ways I I*, for supporting said chains, wheels *g** at the ends of the tilting tracks or ways for supporting the chains, and chain-driving wheels *h*, concentric with the pivotal center of said tracks or ways, substantially as herein described.

9. The combination, with the cylinder B and receiving-table F, of the endless chains H, provided with delivery-grippers, the tracks or ways I I*, pivoted between their ends and provided at their ends with the chain-supporting wheels, the cross-shaft J, concentric with the pivotal center of said tracks or ways, the diagonal shaft D, geared to the shaft J and to the cylinder, and cam-shaped spur-wheels interposed between the shaft D and the cylinder, whereby the uniform rotation of the cylinder is made to produce an alternately accelerated and retarded movement of the shaft D, substantially as herein described.

10. The combination, with the cylinder and receiving-table arranged as described, of an endless carrier provided with delivery-grippers arranged at the front of the cylinder, tilting tracks or ways supporting said carrier and made heavier at their outer ends so as to descend automatically at the outer ends, and mechanism, substantially such as described, for effecting the tilting movement of said tracks or ways in one direction and controlling their automatic tilting movement in the other direction, substantially as herein set forth.

C. B. COTTRELL.

Witnesses:
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FREDK. HAYNES.