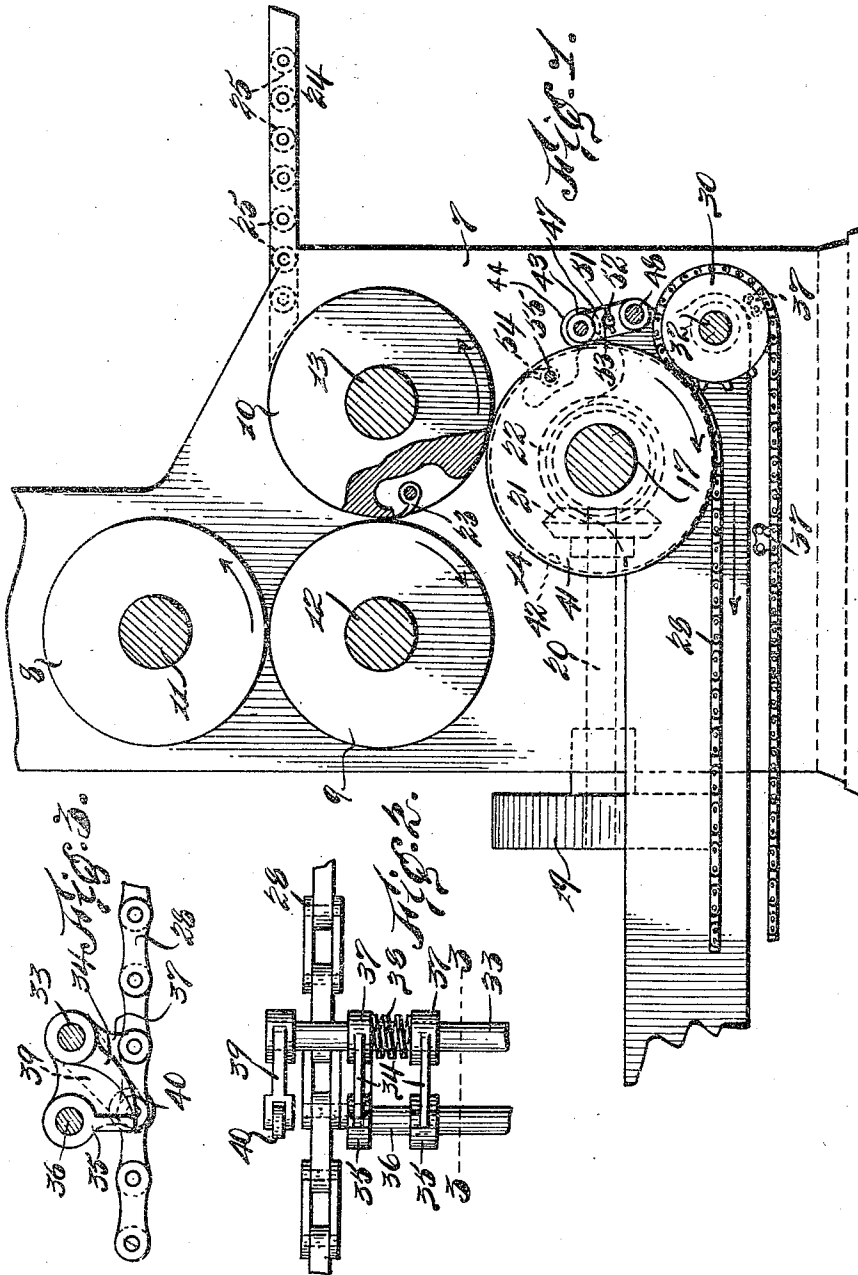


I. F. NILES.
SLITTING ATTACHMENT FOR PRINTING MACHINES.
APPLICATION FILED JULY 25, 1916.

1,293,883.

Patented Feb. 11, 1919.

2 SHEETS—SHEET 1.

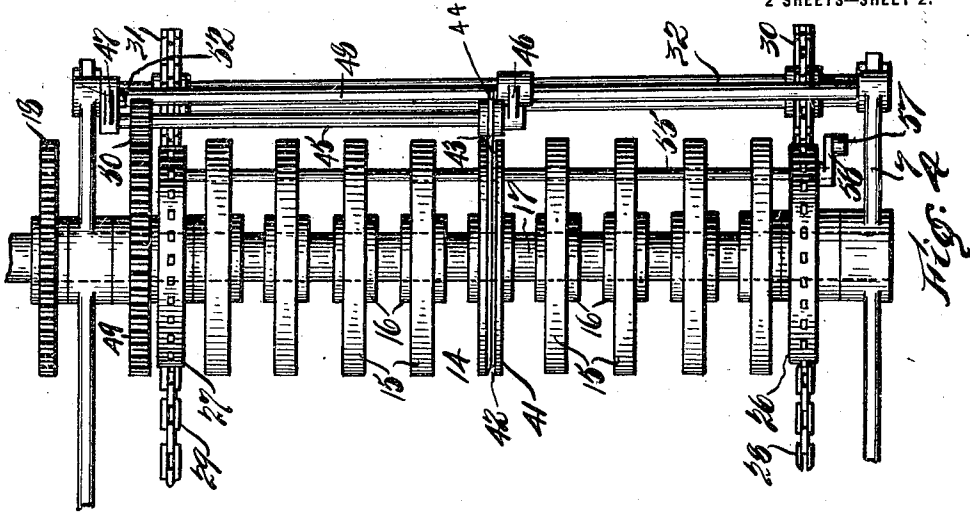
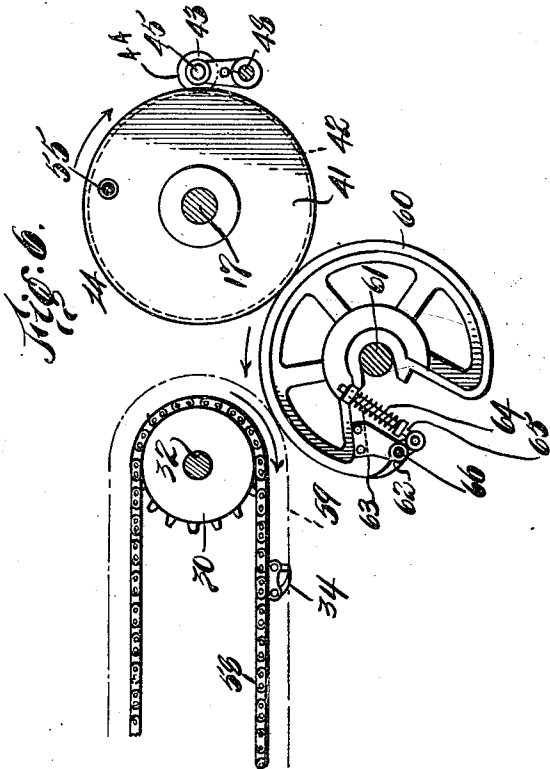
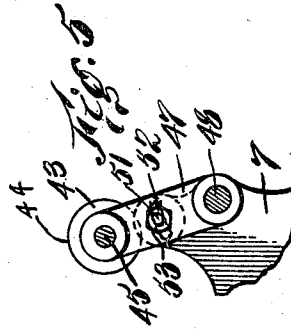


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UNITED STATES PATENT OFFICE.

IRVING F. NILES, OF WARREN, OHIO, ASSIGNOR TO THE HARRIS AUTOMATIC PRESS COMPANY, OF NILES, OHIO, A CORPORATION OF OHIO.

SLITTING ATTACHMENT FOR PRINTING-MACHINES.

1,293,883.

Specification of Letters Patent.

Patented Feb. 11, 1919.

Application filed July 25, 1916. Serial No. 111,115.

To all whom it may concern:

Be it known that I, IRVING F. NILES, a citizen of the United States, residing at Warren, in the county of Trumbull and State of Ohio, have invented certain new and useful Improvements in Slitting Attachments for Printing-Machines, of which the following is a specification, reference being made to the accompanying drawings, forming a part thereof.

This invention relates to certain improvements in attachments or devices employed to slit or longitudinally divide the sheets of paper stock used in printing machines, as they pass from such machines or presses to be transferred to delivery mechanisms, and the objects of my invention are, among other things, to provide an improved slitting attachment which shall directly cooperate with one of the several disks of an intermediate skeleton delivery cylinder, arranged between the impression cylinder and such delivery mechanisms, whereby such slitting attachment shall be free to perform its slitting function without obstructing the path of the gripper bars, carried by any of the required delivery mechanisms. A further object of my invention is to positively remove the sheet of paper stock from the impression cylinder and retain the leading edge at all times under positive control by means of grippers, until the slitting operation is completed. In the present embodiment shown, this is accomplished by the direct and positive transfer of the sheet to the grippers located on the delivery cylinder, and thence to the grippers on the chain delivery bars traveling at the same speed, during which period my improved slitting attachment will have performed its function in longitudinally dividing the sheets as they pass from the printing machine.

With these and other objects in view, the invention comprises the constructions and operating parts forming the slitting attachment herein shown and hereinafter to be described as one embodiment of my invention, such other features being particularly pointed out in the appended claims.

The accompanying drawings illustrate this embodiment of the invention in connection with an "off-set" printing press, the same serving, in connection with a chain delivery mechanism, to fully explain the invention which is not restricted, however, to

any particular form or type of printing machine or sheet-delivery construction.

Referring to the accompanying drawings,—

Figure 1 is a vertical sectional view of a printing machine provided with my improved slitting attachment, the gears being omitted;

Fig. 2 is an enlarged fragmentary detail plan view of sheet-grippers;

Fig. 3 is a sectional view taken on the line 3—3 shown in Fig. 2;

Fig. 4 is a plan view of delivery cylinder disks, and also of the slitter disk, showing the construction and arrangement for operating same;

Fig. 5 is a fragmentary detail view illustrating the manner of adjustably locating the slitter relatively to the slitter disk; and

Fig. 6 is a diagrammatic sectional side view showing a modified arrangement of the slitting attachment relatively to a sheet-delivery mechanism.

Similar numerals refer to similar parts throughout the several figures.

Referring to Fig. 1, the frame 7 supports the bearings of the form-cylinder 8, the transfer-cylinder 9, and the impression-cylinder 10, said cylinders being mounted on the shafts 11, 12 and 13 respectively, which are journaled in the frame 7, as shown. The cylinders are so constructed and arranged in the frame 7 that the transfer-cylinder 9, forming a printing-couple with the impression-cylinder 10, receives its design from the form-cylinder 8; the form, transfer and impression cylinders have each fastened thereto suitable gears whose pitch diameter coincides with the periphery of the respective cylinders. These gears (not shown) intermesh and form the driving mechanism to secure proper rotation for the respective cylinders, the impression-cylinder 10 rotating in a contra-clockwise direction, as shown by the arrow in Fig. 1.

14 indicates the skeleton delivery-cylinder, preferably constructed of a plurality of disks 15 of equal diameter with the impression-cylinder 10, each mounted on the collars 16 adjustably secured to the shaft 17, as shown more particularly in Fig. 4, the shaft 17 being journaled in the frame 7. The skeleton delivery-cylinder 14 has a suitable gear 18 secured thereto, which intermeshes with the gear on the impression-cylinder 10,

the cylinders 10 and 14 being arranged to revolve at the same peripheral speed. The power is derived from any suitable source, through the pulley 19 mounted on the pulley shaft 20, thence through the miter-gears 21 and 22, the gear 22 being mounted on the shaft 17 of the cylinder 14. The delivery-cylinder 14 is driven in a clockwise direction, as shown by the arrow in Fig. 1, by the foregoing mechanism, and the intermeshing gears on the impression, transfer and form cylinders coact to secure the proper rotation of the respective cylinders, as shown in Fig. 1. 23 designates a form of stock or sheet grippers carried by the impression-cylinder 10, which are arranged to successively seize the individual sheets which have been advanced on the feed-table 24 secured to the frame 7. The feed-table 24 has a plurality of transverse feed-rollers 25 journaled thereto to advance the individual sheets to the impression-cylinder 10 to be seized by the grippers 23, as has been described. Since these are common forms of printing machinery construction, and are well-known in the art, they need not be more fully shown and described.

Referring to Fig. 4, 26 and 27 indicate two spaced-apart sprocket wheels mounted on the shaft 17, said wheels being of slightly smaller diameter than the disks 15 which constitute the skeleton delivery-cylinder 14. Traveling beneath, and operated by, the sprocket wheels 26 and 27 are two spaced-apart endless sprocket chains 28 and 29, which are arranged to move with the same peripheral speed as the periphery of the cylinder 14. These sprocket chains 28 and 29 pass around two smaller sprocket wheels 30 and 31 respectively, mounted on a transverse shaft 32 journaled in the frame 7, as shown in Figs. 1 and 4. The chains 28 and 29 travel in the direction of the arrow shown in Fig. 1. It will be understood that the two endless chains 28 and 29 are located at either side of the delivery-cylinder 14, and necessarily move simultaneously in the same direction, and at the same speed with each other, to carry and transfer the successive sheets from the cylinder 14, as will be understood by those familiar with printing machinery construction.

These chains 28 and 29 carry means for transferring the sheets or stock from the delivery-cylinder 14, and such means are arranged in the present embodiment to travel with the pitch line of the chains, and therefore, at the same speed at all times, and also with the same speed as that of the peripheries of the disks 15 comprising the delivery-cylinder 14. In the present embodiment, the stock-engaging means or sheet-grippers are shown in detail in Figs. 2 and 3. The particular construction of such grippers may be widely varied. Referring to Figs. 2 and

3, the grippers comprise a rock-shaft 33 carrying grippers 34 which are normally held in engagement with the collars 35 secured to the rod 36 held in close parallelism with the shaft 33. The shaft 33 and rod 36 travel in a different plane from that of the chains 28 and 29, and are mounted thereon so as to be held either inwardly or outwardly disposed from the carrier chains 28 and 29, as shown in Figs. 1 and 6. The device to accomplish this relationship comprises the frame 37 securely affixed to the chains 28 and 29. The grippers 34 are normally held in engagement with the collars 35 by a spring 38 attached to and wound around the shaft 33, and fastened to the frame 37. At one end (shown in Fig. 2), each gripper shaft 33 carries an arm 39 bearing on its outer end a frictional roller 40 which, upon engagement with suitably located cams or other devices arranged on the machine, will effect the opening of the grippers 34 at the proper times and in predetermined positions.

Referring particularly to Figs. 1 and 4, I have here shown my improved stock-slitting attachment to longitudinally divide the sheets as they pass around the delivery-cylinder 14, which attachment shall directly cooperate with the delivery-cylinder intermediate the impression-cylinder 10 and the chain-delivery devices heretofore described. As a female member, I utilize any one of the disks 15, in this case the disk 41, which has the cutting groove 42 formed in its periphery; it is obvious that other of such disks 15 may be utilized, and located and adjusted in various transverse positions on the shaft 17 to longitudinally cut or slit the successive sheets of stock in different sizes, as may be required. The male member comprises the small disk 43 having the cutting edge 44 formed in its periphery to cooperate with the groove 42, as shown in Fig. 4. The disk 43 is adjustably secured to the rotating transverse shaft 45 to cooperate with the disk 41; the shaft 45 is journaled in the rock-arms 46 and 47 mounted on the shaft 48 secured to the frame 7. The shaft 17 has secured thereto the gear 49 which meshes with the gear 50 mounted on the shaft 45, to secure the proper rotation of the disk 43 in the direction of the arrow shown in Fig. 1. The rock-arms 46 and 47 are adjusted to move to and from the disks 15 of the cylinder 14 to make a slitting engagement, the arm 47 having the projecting pin 51 passing through the curved slot 52 formed in a bracket mounted on the shaft 48, the nut 53 being used on the end of the pin 51, to hold the arms in the properly adjusted position, as shown in Figs. 4 and 5. 54 indicates a form of stock or sheet grippers carried on the transverse bar 55 loosely journaled within the outer circumference of the disks 15, as shown in Figs. 1

and 4, the grippers 54 being arranged to successively seize the leading edge of the individual sheets passing from the impression-cylinder 10, and hold same under positive control during the slitting operation and until the same has been seized by the gripping devices mounted on the chains 28 and 29. The outer end of the bar 55 carries the arm 56 having a frictional roller 57 mounted thereon, which, upon engagement with suitably located cams or other devices arranged on the machine, will effect the opening of the grippers 54 when required for the proper operation of the apparatus.

It will be noted that a convenient and simple form of slitting attachment has been constructed which is employed in direct co-operation with the delivery-cylinder having delivery disks of the same size as the impression-cylinder, whereby the sheet is longitudinally slitted while passing at the same speed from the press to the delivery-mechanism with the leading edge of the individual sheets under positive control of the various grippers at all times.

In Fig. 6, I have shown an alternate construction which comprises the interposition of an auxiliary transfer-cylinder between the delivery-cylinder 14 and the chain delivery mechanisms proper. In the constructions shown in Fig. 1 to 4 inclusive, the individual sheets are transferred from the delivery cylinder 14 to the upper portion of the delivery chains 28 and 29 beneath the printing machine, and these chains in turn transfer the sheets successively to the under portion of a second chain delivery mechanism located immediately above a delivery table (not shown).

In the Fig. 6 construction, the sheets are delivered directly to the final chain delivery, in this case the chains 58, having grippers 34 elevated above the pitch line of such chains, the line of travel of such grippers 34 being shown by the broken line 59. By this form, the intermediate delivery chains are dispensed with, and the delivery chains 58 carry the sheets to the left and directly deposit the successive sheets on the delivery table. 60 indicates the auxiliary transfer-cylinder of the same diameter as the cylinder 14, which may be adjustably mounted on the shaft 61 as shown, and is adapted to rotate in a contra-clockwise direction by suitable gears (not shown). This cylinder 60 is so arranged in the frame 7 that its periphery coacts with the peripheries of the disks 15 as well as the line of travel 59, as shown; it carries the grippers 62 suitably mounted in the cylinder 60 and normally held in engagement with the periphery edge 63 of the cylinder 60 by the spring 64 coiled about the rod 65. The grippers 62 open at predetermined times to pass the leading edge of the successive sheets to the grippers 34 by suit-

able cams operating on an arm (not shown) carried by the shaft 66. In this construction the successive sheets are transferred directly from the cylinder 60 to the lower run of the delivery chains 58, since it is preferable that such sheets be carried on the lower run of the delivery chains prior to their being deposited on the delivery table.

The operation of the hereinbefore described slitting attachment is substantially as follows;—In the Figs. 1 to 4 construction, the disks 41 and 43 are brought into coöperative engagement to slit the sheets in suitable sizes, and are then secured by the rock-arms 46 and 47 being held in proper position. The individual sheets, after passing from the feed-table 24, are seized by the grippers 23, and are then seized by the grippers 54 and carried in a clockwise direction about the delivery-cylinder 14, during which period the slitting of the sheets is begun by the slitting disks 41 and 43. Then the grippers on the chains 28 and 29 grasp the leading edge of the sheet from the grippers 54 and carry same to the left, the slitting operation being concluded as the sheets are passed along the top of the chains 28 and 29. It will be noted the slitting attachment does not interfere with the path of the gripper bar 55, and that the sheets are always held under positive control until the slitting operation is completed. In the Fig. 6 construction, the operation is substantially the same, the grippers 62 taking the leading edges of the individual sheets from the grippers 54 and passing same at the same speed around the cylinder 60 so that such leading edges may be seized by the grippers 34 traveling in the line 59 to the left to be finally and directly deposited upon a suitable delivery table. In this construction it will be noted that the successive sheets are positively maintained under direct control while the slitting attachment is performing its function in dividing the sheets.

While the construction described embodies the invention in its preferred form, it will be understood that changes and variations may be made therein without departing from the invention.

It is to be further understood that while constructions embodying the invention are particularly adapted for use in connection with printing machines, they may be employed in other relations.

I claim as my invention:

1. The combination with a rotatable delivery-cylinder to remove stock from the impression cylinder of a printing or like machine, of a delivery mechanism to transfer said stock from said delivery-cylinder, a positively actuated slitting mechanism coacting with said delivery cylinder and arranged wholly between said impression cylinder and said delivery mechanism, means carried

by said delivery cylinder and said delivery mechanism to hold said stock under control during the operation of said slitting mechanism, and means to actuate said cylinders, 5
said mechanism and said controlling means whereby said stock travels throughout the entire slitting operations at the same speed with said slitting mechanism.

2. The combination with a rotatable delivery-cylinder to remove stock from the impression cylinder of a printing or like machine, of a delivery mechanism to transfer said stock from said delivery-cylinder, a positively actuated slitting mechanism coacting 15
with said delivery cylinder and arranged wholly between said impression cylinder and said delivery mechanism, means carried by said delivery cylinder and said delivery mechanism to hold said stock under control continuously during the operation of said slitting mechanism, and means to actuate 20
said cylinders, said mechanisms and said controlling means whereby said stock travels throughout the entire slitting operation at the same speed with said slitting mechanism. 25

3. The combination with a rotatable delivery-cylinder to remove stock from the impression cylinder of a printing or like machine, of a delivery mechanism to transfer 30
said stock from said delivery-cylinder, a positively actuated slitting mechanism coacting with said delivery cylinder and arranged wholly between said impression cylinder and said delivery mechanism, means 35
carried by said delivery cylinder and said delivery mechanism to hold said stock under positive control continuously during the operation of said slitting mechanism, and means to actuate said cylinders, said mechanisms and said controlling means whereby 40
said stock travels throughout the entire slitting operation at the same speed with said slitting mechanism.

4. The combination with a rotatable delivery-cylinder to remove stock from the impression cylinder of a printing or like machine, of a delivery mechanism to transfer 45
said stock from said delivery-cylinder, a positively actuated slitting mechanism coacting with said delivery cylinder and arranged wholly between said impression cylinder and said delivery mechanism, means 50
carried by said delivery cylinder and said delivery mechanism to hold the leading edge of said stock under control during the operation of said slitting mechanism, and means to actuate said cylinders, said mechanisms and said controlling means whereby 55
said stock travels throughout the entire slitting operation at the same speed with said slitting mechanism. 60

5. The combination with a rotatable delivery-cylinder to remove stock from the impression cylinder of a printing or like 65

machine, of a delivery mechanism to transfer said stock from said delivery-cylinder, a positively actuated slitting mechanism coacting with said delivery cylinder and arranged wholly between said impression cylinder and said delivery mechanism, means 70
carried by said delivery cylinder and said delivery mechanism to hold the leading edge of said stock under control continuously during the operation of said slitting mechanism, and means to actuate said cylinders, 75
said mechanisms and said controlling means whereby said stock travels throughout the entire slitting operation at the same speed with said slitting mechanism. 80

6. The combination with a rotatable delivery-cylinder to remove stock from the impression cylinder of a printing or like machine, of a delivery mechanism to transfer 85
said stock from said delivery-cylinder, a positively actuated slitting mechanism coacting with said delivery cylinder and arranged wholly between said impression cylinder and said delivery mechanism, means 90
carried by said delivery cylinder and said delivery mechanism to hold the leading edge of said stock under positive control continuously during the operation of said slitting mechanism, and means to actuate said cylinders, 95
said mechanisms and said controlling means whereby said stock travels throughout the entire slitting operation at the same speed with said slitting mechanism.

7. The combination with a rotatable delivery-cylinder to remove stock from the impression cylinder of a printing or like machine, of a delivery mechanism to transfer 100
said stock from said delivery-cylinder, a positively actuated rotatable slitting edge member transversely adjustable to coact 105
with any part of said delivery cylinder and arranged wholly between said impression cylinder and said delivery mechanism, means carried by said delivery cylinder and said delivery mechanism to hold said stock 110
under control during the operation of said slitting mechanism, and means to actuate said cylinders, said mechanisms and said controlling means whereby said stock travels 115
throughout the entire slitting operation at the same speed with said slitting mechanism.

8. The combination with a rotatable delivery-cylinder to remove stock from the impression cylinder of a printing or like machine, of a delivery mechanism to transfer 120
said stock from said delivery-cylinder, a positively actuated rotatable slitting edge member transversely adjustable to coact 125
with any part of said delivery cylinder and arranged wholly between said impression cylinder and said delivery mechanism, means carried by said delivery cylinder and said delivery mechanism to hold said stock 130
under control continuously during the operation of said slitting mechanism.

ation of said slitting mechanism, and means to actuate said cylinders, said mechanisms and said controlling means whereby said stock travels throughout the entire slitting operation at the same speed with said slitting mechanism.

9. The combination with a rotatable delivery-cylinder to remove stock from the impression cylinder of a printing or like machine, of a delivery mechanism to transfer said stock from said delivery-cylinder, a positively actuated rotatable slitting edge member transversely adjustable to coact with any part of said delivery cylinder and arranged wholly between said impression

cylinder and said delivery mechanism, means carried by said delivery cylinder and said delivery mechanism to hold said stock under positive control continuously during the operation of said slitting mechanism, and means to actuate said cylinders, said mechanisms and said controlling means whereby said stock travels throughout the entire slitting operation at the same speed with said slitting mechanism.

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."