

Aug. 8, 1967

M. A. R. BERNARD

3,334,722

DEVICE FOR ADVANCING PAPER WEBS IN PRINTING MECHANISMS

Filed May 3, 1965

11 Sheets-Sheet 1

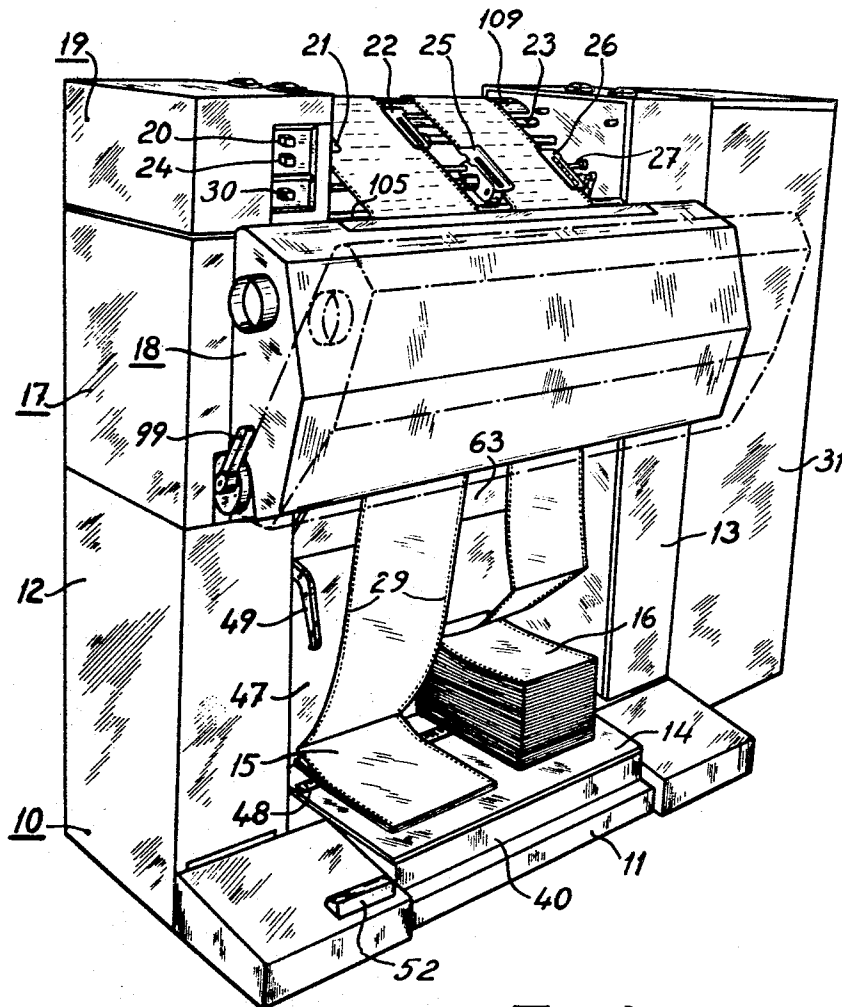


Fig. 1

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DEVICE FOR ADVANCING PAPER WEBS IN PRINTING MECHANISMS

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11 Sheets-Sheet 2

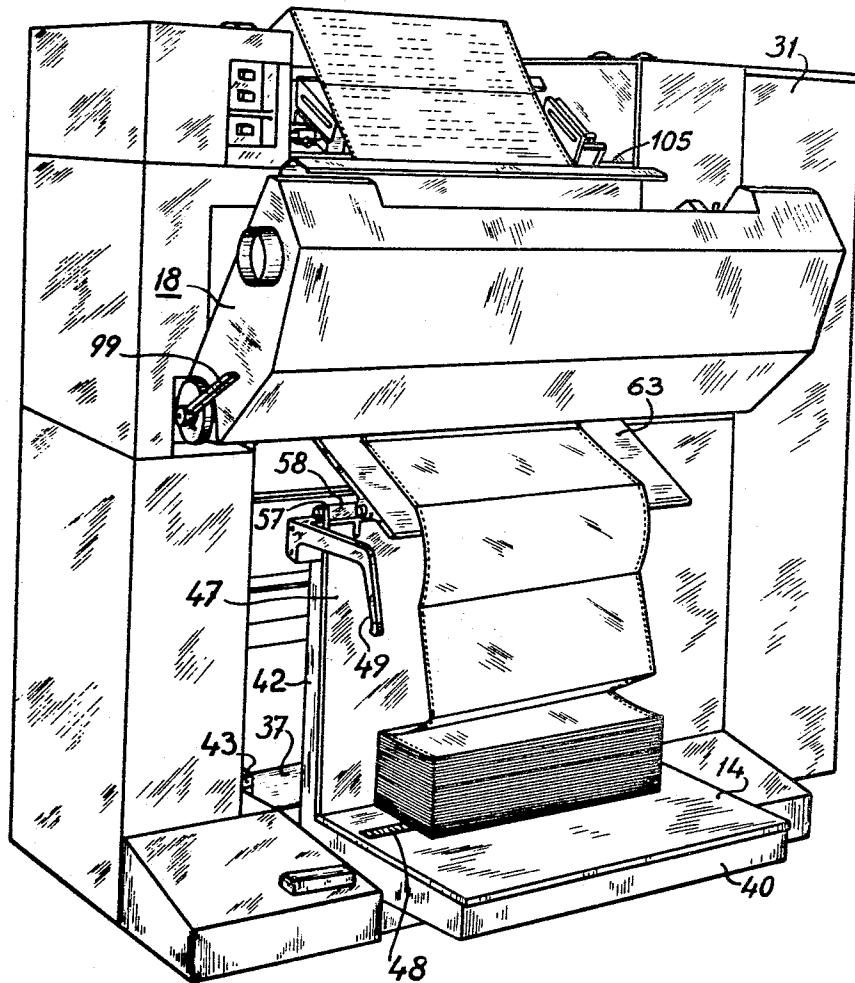


Fig. 2

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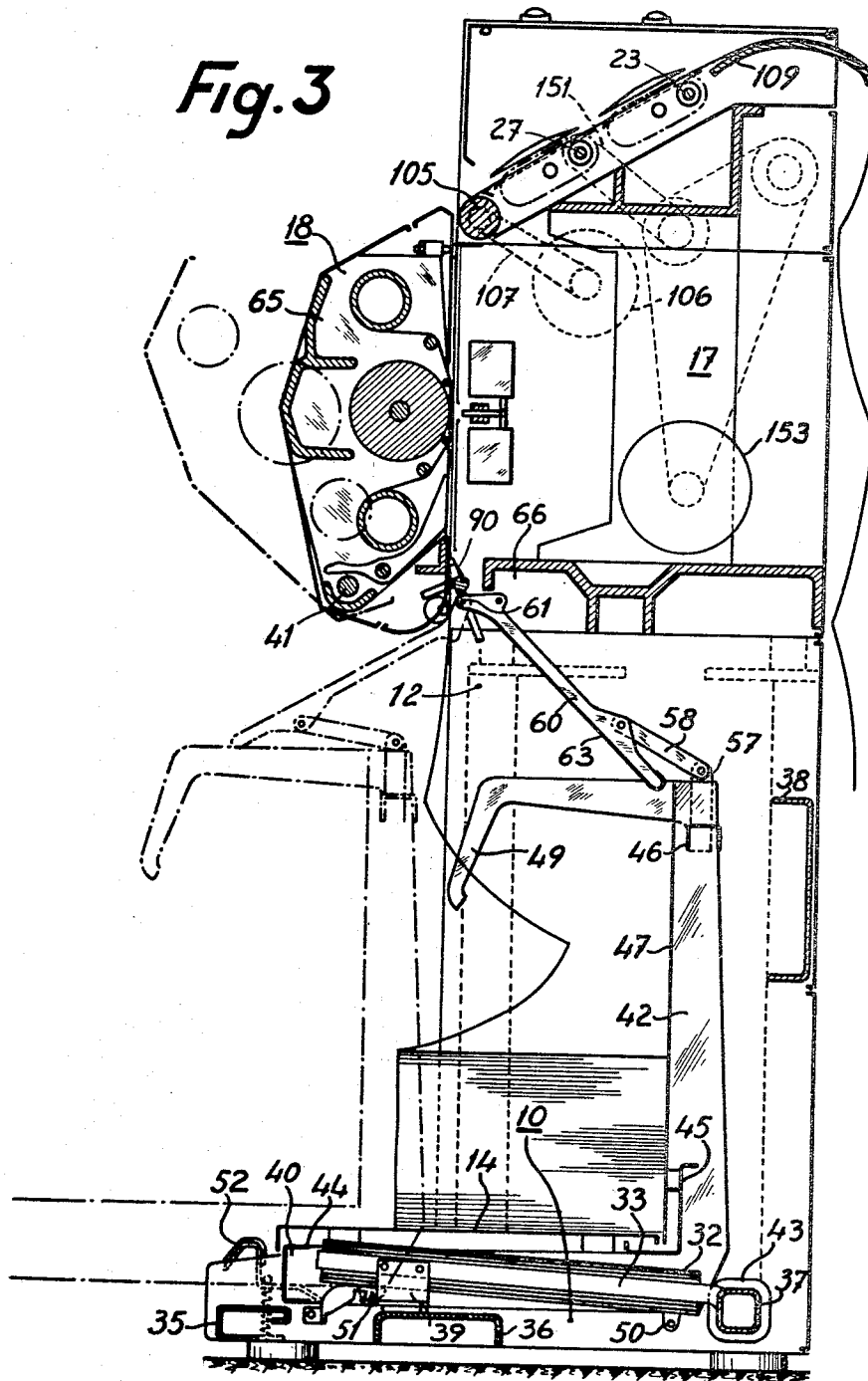
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DEVICE FOR ADVANCING PAPER WEBS IN PRINTING MECHANISMS

Filed May 3, 1965

11 Sheets-Sheet 3



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Aug. 8, 1967

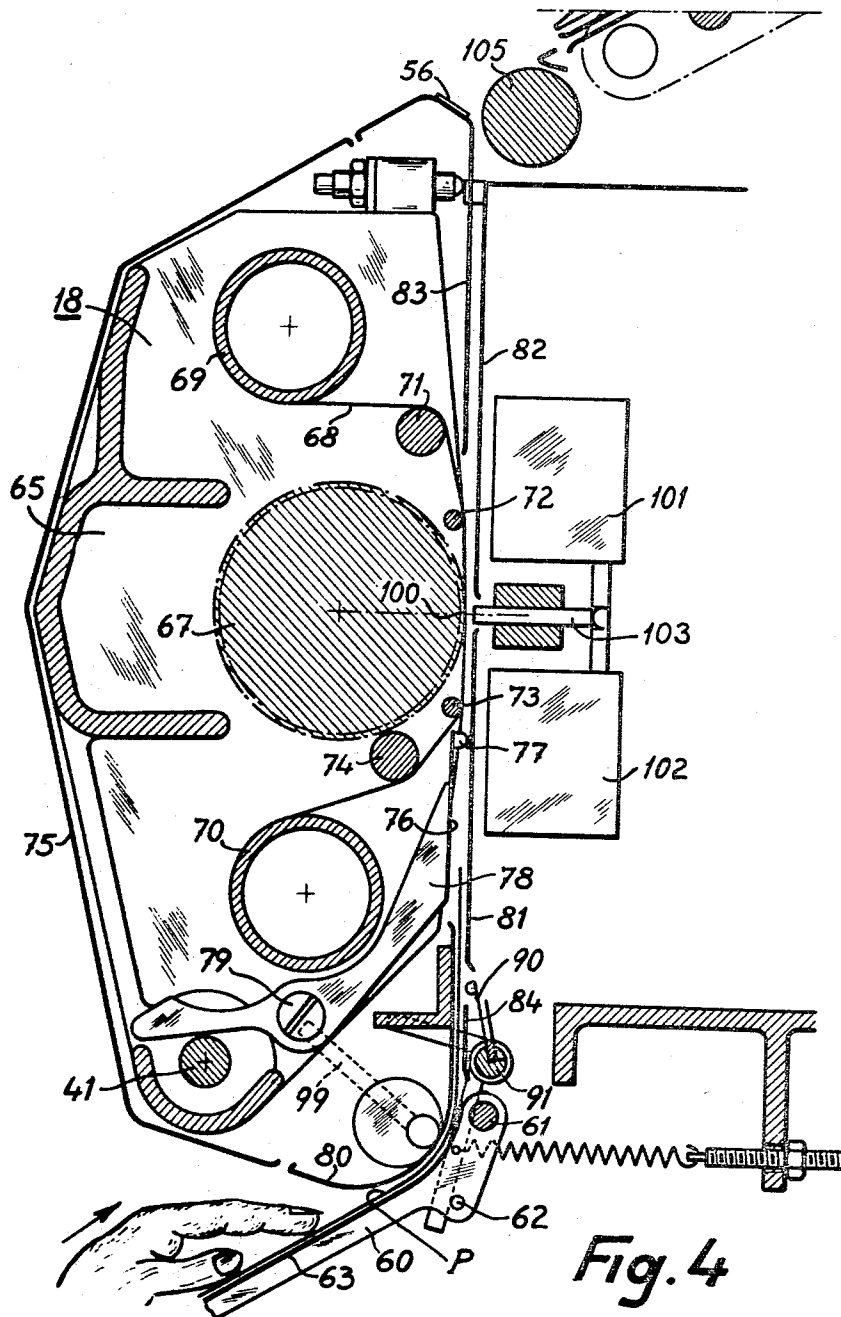
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3,334,722

DEVICE FOR ADVANCING PAPER WEBS IN PRINTING MECHANISMS

Filed May 3, 1965

11 Sheets-Sheet 4



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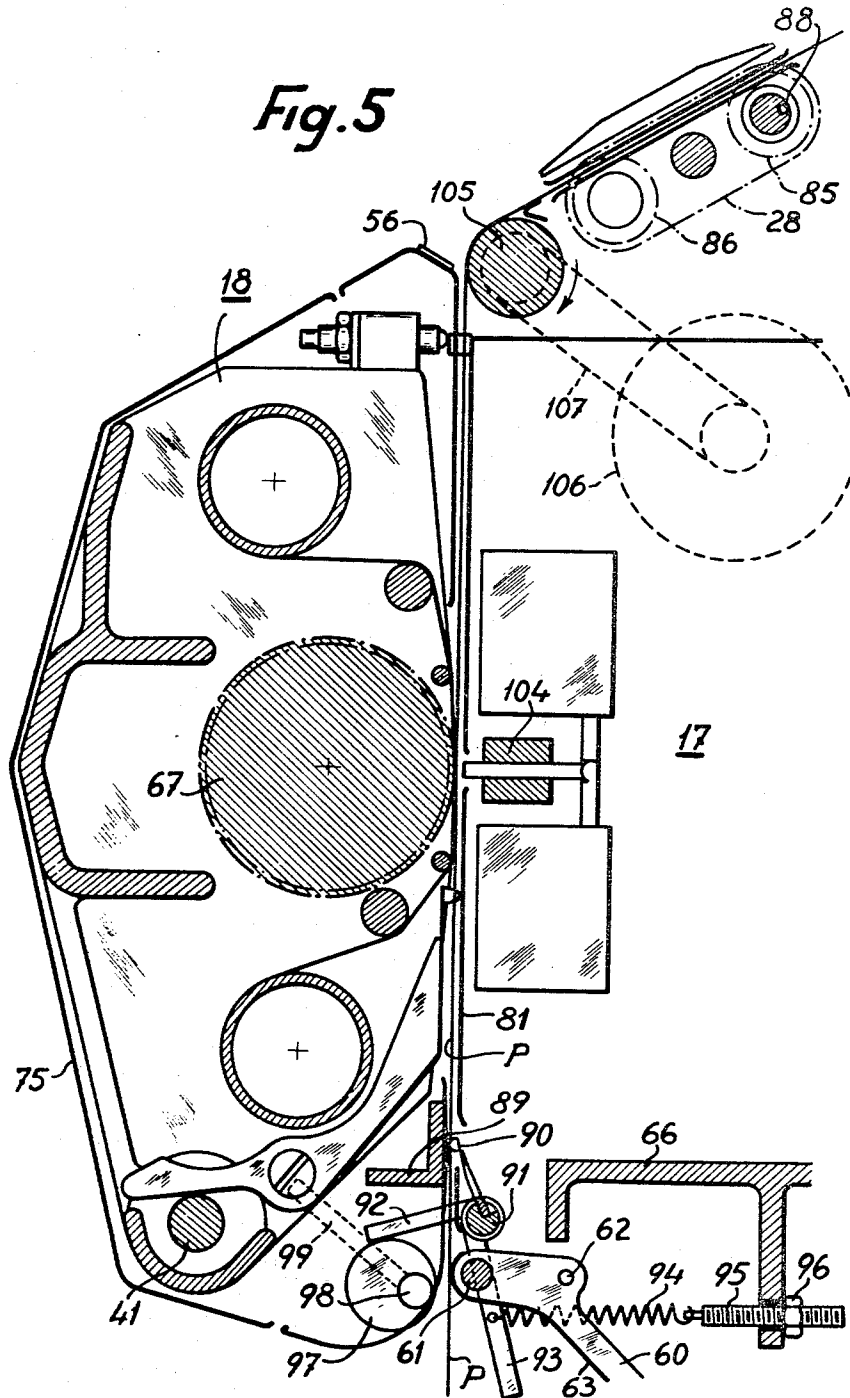
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3,334,722

DEVICE FOR ADVANCING PAPER WEBS IN PRINTING MECHANISMS

Filed May 3, 1965

11 Sheets-Sheet 5



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Aug. 8, 1967

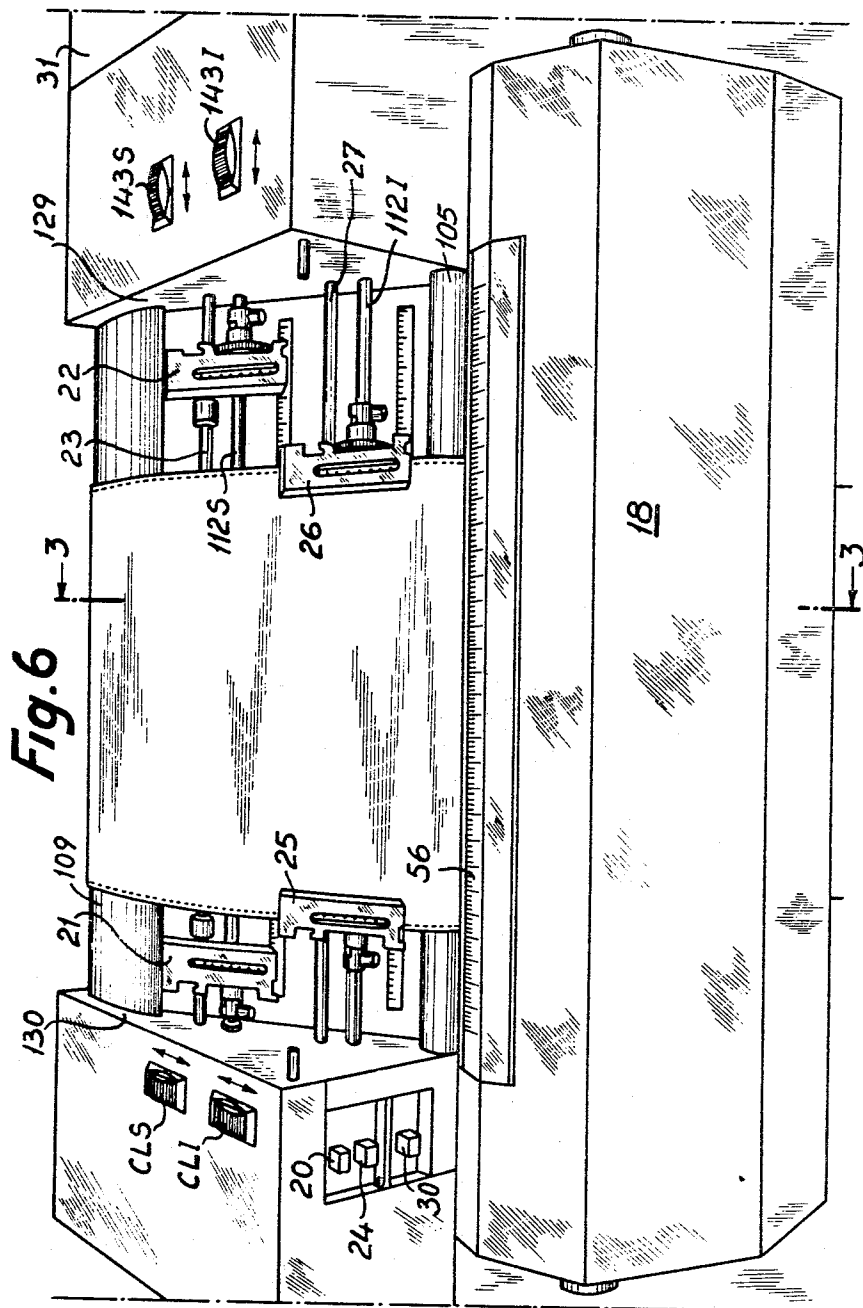
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3,334,722

DEVICE FOR ADVANCING PAPER WEBS IN PRINTING MECHANISMS

Filed May 3, 1965

11 Sheets-Sheet 6



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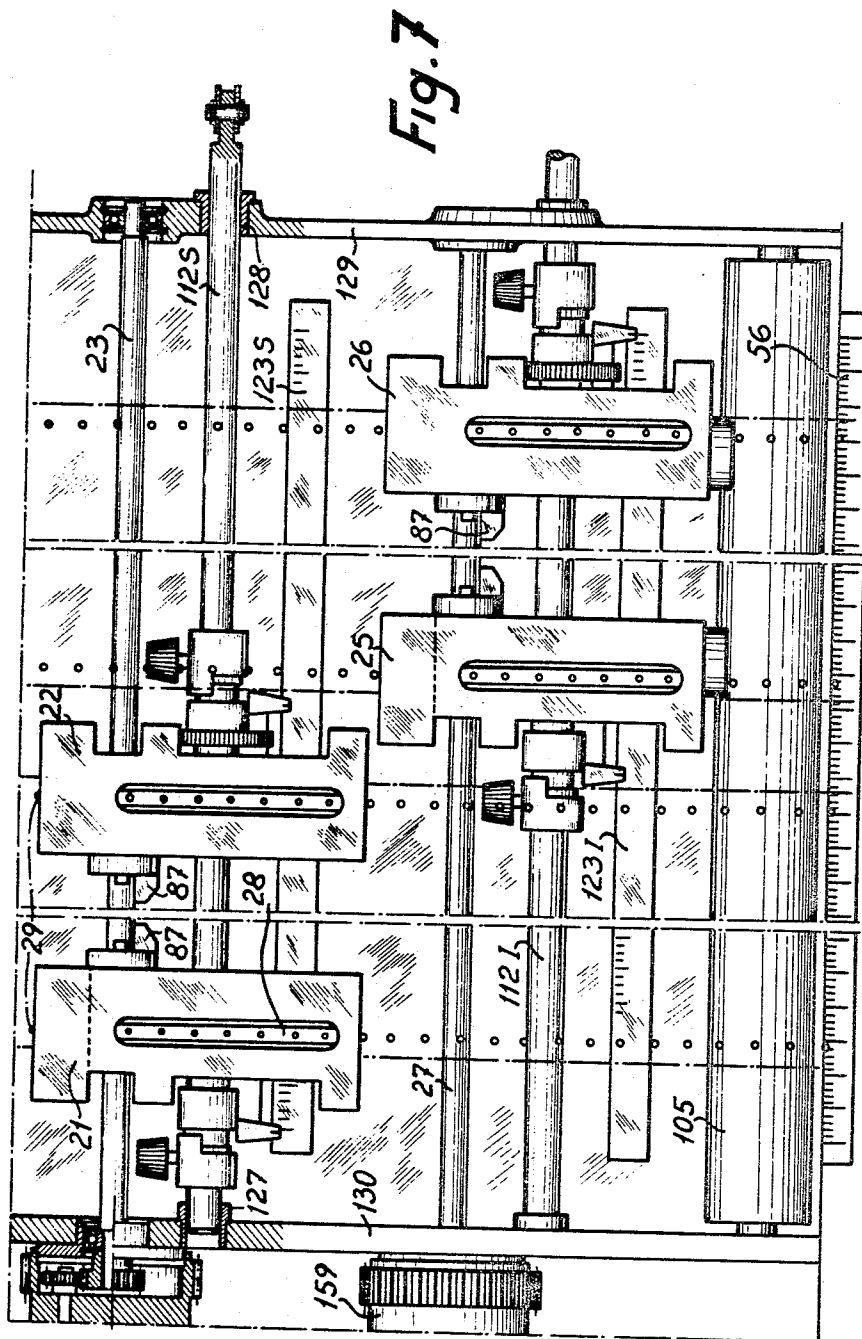
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3,334,722

DEVICE FOR ADVANCING PAPER WEBS IN PRINTING MECHANISMS

Filed May 3, 1965

11 Sheets-Sheet 7



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Aug. 8, 1967

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3,334,722

DEVICE FOR ADVANCING PAPER WEBS IN PRINTING MECHANISMS

Filed May 3, 1965

11 Sheets-Sheet 3

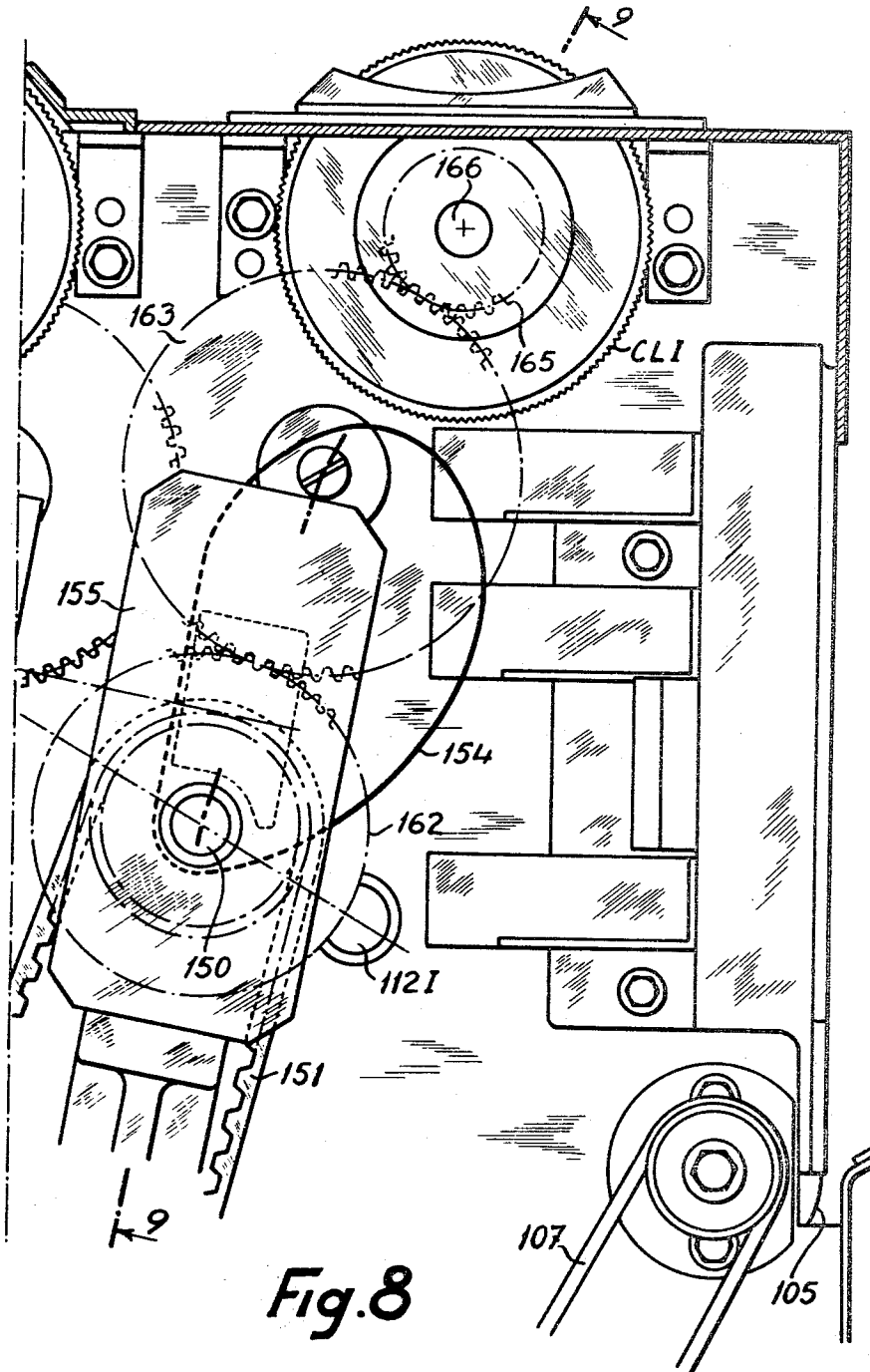


Fig. 8

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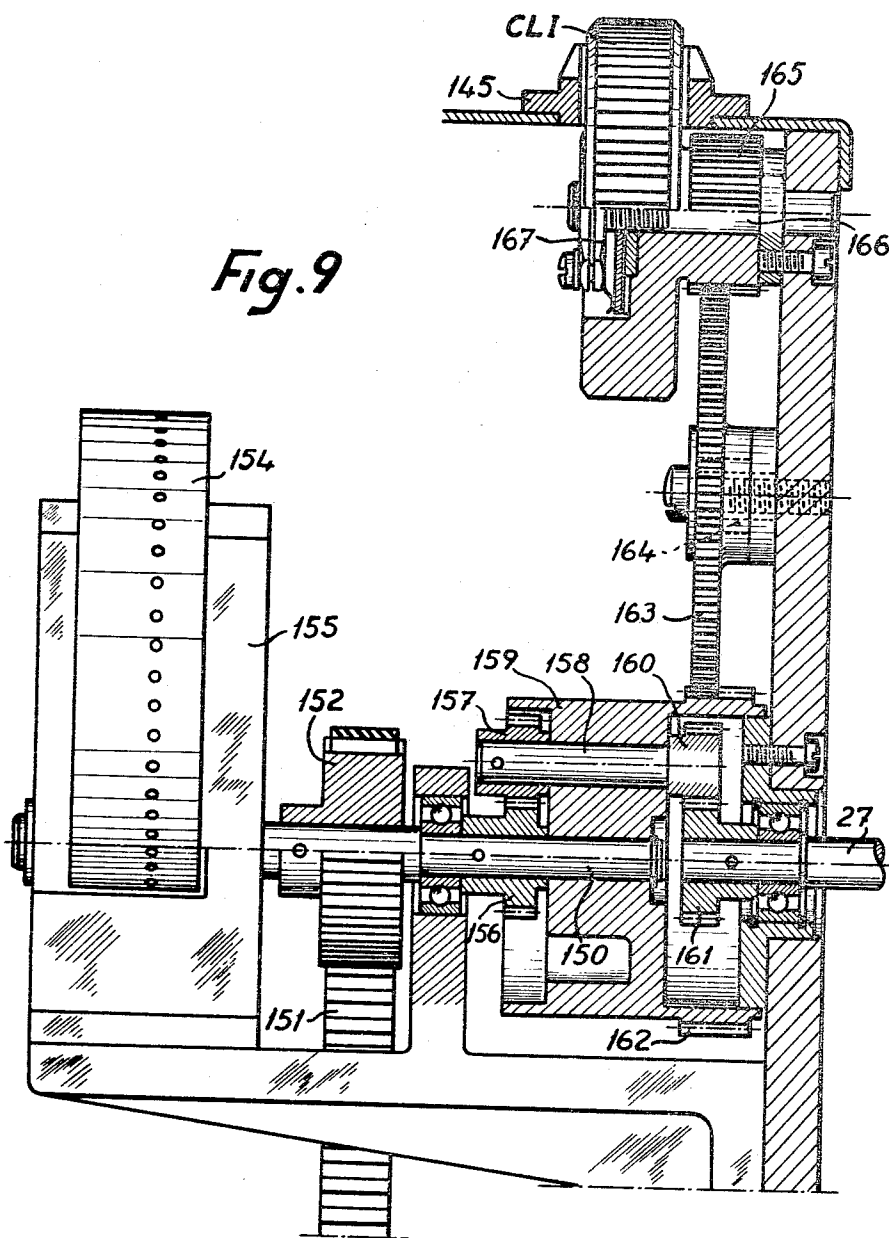
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3,334,722

DEVICE FOR ADVANCING PAPER WEBS IN PRINTING MECHANISMS

Filed May 3, 1965

11 Sheets-Sheet 9



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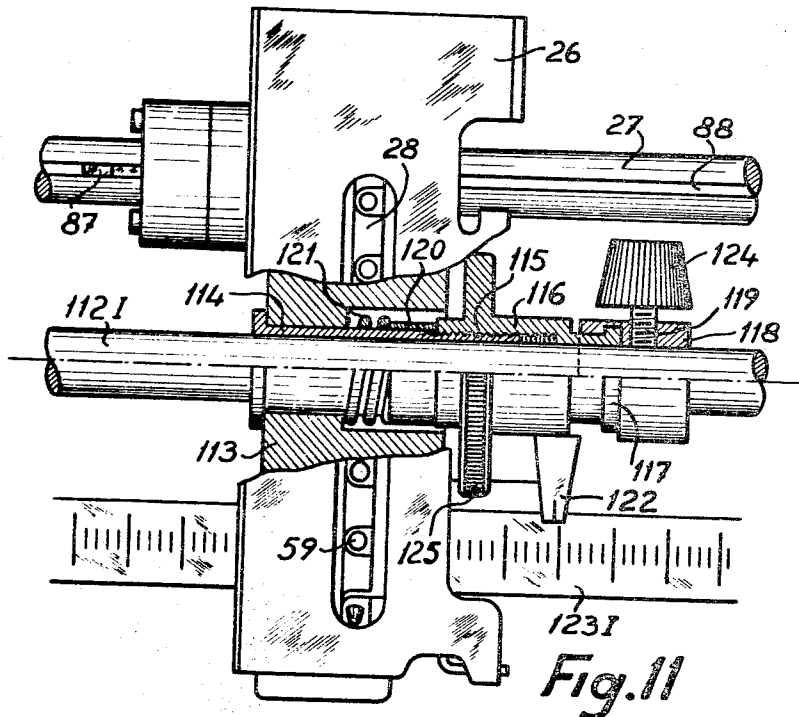
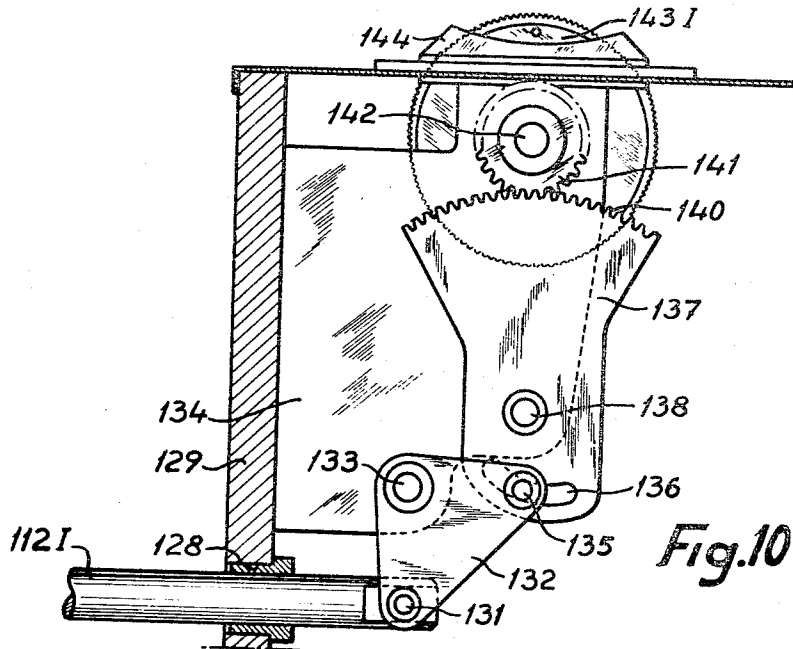
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3,334,722

DEVICE FOR ADVANCING PAPER WEBS IN PRINTING MECHANISMS

Filed May 3, 1965

11 Sheets-Sheet 10



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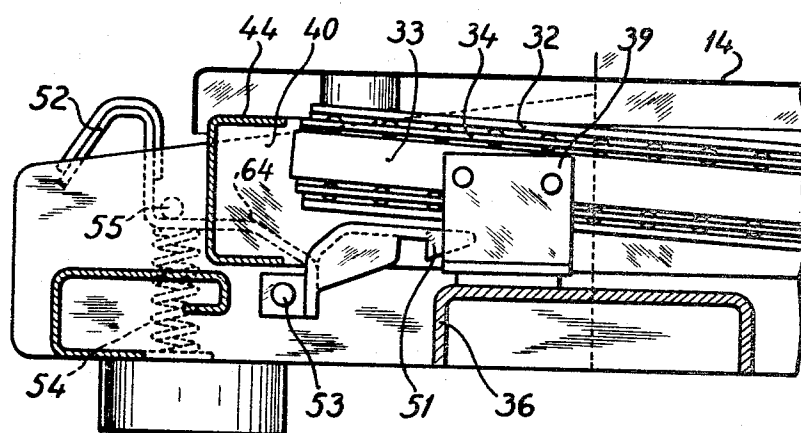
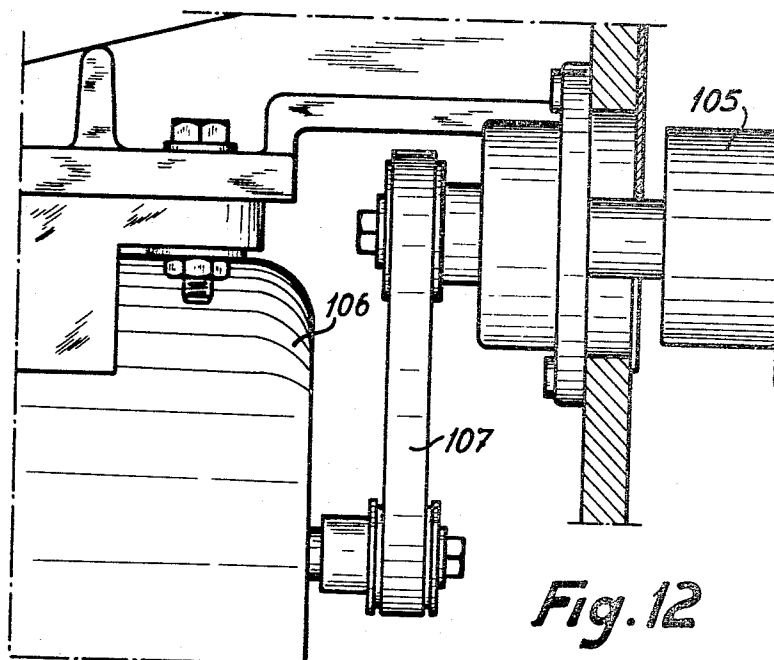
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3,334,722

DEVICE FOR ADVANCING PAPER WEBS IN PRINTING MECHANISMS

Filed May 3, 1965

11 Sheets-Sheet 11



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3,334,722

DEVICE FOR ADVANCING PAPER WEBS IN PRINTING MECHANISMS

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Filed May 3, 1965, Ser. No. 452,588

Claims priority, application France, May 15, 1964, 974,773

2 Claims. (Cl. 197—133)

The present invention relates to improvements in the positioning and the feed advance of the paper in printing machines and it concerns more particularly improvements applicable to devices for loading, driving and adjusting the register of the paper in high-speed printing machines employed in large mechanographical accounting units, and in electronic information-processing equipment or similar installations.

The improvements according to the invention will be described in their application to a printing machine comprising a character drum, in which the striking is electronically controlled, the said machine being more particularly adapted for rapidly printing data line-by-line on printed forms on one or more paper webs fed into the machine, each under the control of a programme for automatically making up into pages data transmitted to the said machine for printing.

In printing machines of this category, printing rates corresponding to 50,000 to 100,000 printed characters or signs per minute can normally be obtained, depending upon the speed of rotation of the character drum, and they are particularly adapted for the rapid and continuous printing of bank account statements, dockets, invoices, pay sheets, etc.

In order to supply at a sufficient speed the printing paper required for working these machines, the said paper is generally stocked in the form of continuous webs which are presented in rolls, or folded in zig-zag form, a number of paper webs optionally being stacked with the interposition of carbon-coated surfaces for producing duplicates.

It will appear obvious to any person skilled in this field that the improvements which are to be described are also applicable separately or in combination to different machines such as printing machines comprising type wheels or rocks or even to machines carrying out electrochemical, magnetic, electrostatic or other printing processes, regardless of the nature of the printing paper employed.

The invention concerns improvements which have the objects of enabling the loading of a machine with one or more paper webs to be readily and rapidly carried out, of permitting an accurate adjustment of the register of the printing on the lines and the columns of the printed forms, and of enabling the adjustments or corrections to the said register to be readily effected even during the operation of the machine. The invention also concerns improvements which ensure, with relatively simplified equipment, a correct feed advance of the paper even at very high printing rates.

The advantages and features of the invention will be more readily apparent from the following description, with reference to the accompanying drawings, in which:

FIGURE 1 is an external diagrammatic view of a printing machine in operating order, loaded with paper for printing on two webs;

FIGURE 2 is a diagrammatic view of the same machine in the position in which it is loaded with a single paper web;

FIGURE 3 is a diagrammatic vertical sectional view

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through the whole machine along a plane extending along the line 3—3 of FIGURE 6;

FIGURE 4 is a sectional view to a larger scale through the printing mechanism in the paper loading position;

FIGURE 5 is a sectional view corresponding to FIGURE 4, the machine being in operating order with a printing paper in position;

FIGURE 6 is a perspective view of the forward and upper part of the machine and of the operating station, showing the arrangement of the controls for the adjustment of the register of the printing on the paper;

FIGURE 7 is a view of a detail showing an arrangement of traction members for driving two independent paper webs;

FIGURE 8 is an external view of the main parts of a mechanism for driving a paper web in accordance with a programme;

FIGURE 9 is a sectional view along the plane 9—9 of FIGURE 8;

FIGURE 10 is a detailed view of the elements of a mechanism for adjusting the lateral register of a set of traction members;

FIGURE 11 is a detailed view of a device for the accurate adjustment of the lateral positioning of a web traction member;

FIGURE 12 is a detail of the drive of the auxiliary paper feed advance roller, and

FIGURE 13 is a detailed view to a larger scale of a part of FIGURE 3 concerning the mechanism for retaining the paper supporting platform in the advance position.

Since the invention relates only to improvements in the devices for loading, driving and registering the paper, only these devices will be described in detail, while known means, even if directly related to the invention, will be only briefly described.

The machine illustrated in FIGURE 1 is a printing machine having a character drum with mechanical striking action, electromagnetic actuation and electronic control, the general principle of operation of which is known. The component elements and the associated parts of the machine are contained in various parts assembled in a cabinet comprising at the bottom a pedestal 10 supporting the whole machine and formed of a base 11 assembled with two uprights 12 and 13, between which uprights (FIGURE 1) there is disposed a platform 14 to receive one or more paper loads, for example the loads 15 and 16 folded in zig-zag form.

The machine is provided with associated means for checking the presence of reserve paper on the platform and devices for automatically signalling any interruption of the paper web. These arrangements, the use of which is known, do not form part of the invention and will not be described.

The part 17 continuing mainly the striking mechanisms of the machine is mounted on the uprights 12 and 13 of the pedestal. This part also contains the motors of the mechanisms participating in the feed advance of the paper and a part of the electric circuits of the machine.

A movable unit 18, called the "drum unit" and containing the character drum, the inked ribbon for the printing and the motors and the members for controlling and driving the character drum and the ribbon, is adapted to turn about a horizontal pin 41 (FIGURES 3, 4 and 5) which is supported by the frame 66 (FIGURE 3) of the part 17. Means of known type are provided for balancing and braking the movements of the unit 18 and enable the latter to be readily and smoothly opened or closed in order to afford access to the parts contained therein when necessary.

An upper unit 19 disposed above the part 17 contains the devices for the feed advance and the programmed automatic line shift of the paper in the machine, and means for adjusting the register of the printing, even in the course of printing. The said upper part is provided to the left (FIGURES 1, 2 and 6) with three push buttons disposed one above the other. An upper push button 20 serves for the manual initiation of the movement of two upper traction members 21 and 22 which are coupled (FIGURES 1, 6 and 7) to a driving bar 23 for the feed advance of a paper web. A button 24 disposed below the button 20 also permits of manually initiating the movement of two lower traction members 25 and 26 coupled to a driving bar 27 for the feed advance of a second paper web. Many paper driving systems are known which utilize traction members similar to the traction members 21, 22, 25 and 26, which are illustrated in FIGURES 7 and 11, and each of which utilizes a chain 28 provided with studs 59 adapted to be engaged in marginal perforations 29 in the paper webs to be driven (FIGURES 1 and 7).

The push button 30, which is disposed below the button 24, enables the motors of the machine to be instantly stopped when necessary.

A unit 31 provided with movable panels is secured (FIGURES 1, 2 and 6) to the right of the machine and contains the electronic circuits for controlling the striking mechanisms and the circuits for making the connections between the machine and the units from which data are transmitted thereto.

The unit 18 is shown in FIGURE 1 in solid lines in the "closed" position which it necessarily occupies during the operation of the machine. This drum unit is also shown in dash-dotted lines in the "open" position.

The machine is necessarily provided at the rear with devices (not shown) adapted to receive the paper which enters the printing device. In addition, these devices are often mounted on the movable carriage, which serves also for conveying bundles of printed documents.

The sectional view of FIGURE 3 shows that the up-rights (12 and 13) of the pedestal of the machine are connected together by fixed cross members 35, 36, 37 and 38. The platform 14, which supports the paper loads, rests on a carriage 40 adapted to slide on two fixed rails 33 (of which only one is shown in the sectional views of FIGURES 3 and 13) by means of two slide members 32 mounted on intermediate ball races 34 of known type. Each rail 33 is secured on the one hand to a lug 39 fast with the cross member 36 (FIGURES 3 and 13) and on the other hand to the cross member 37 (FIGURE 3). FIGURE 3 shows that the rails 33 are so inclined as to bring the carriage 40 by gravity towards the rear of the machine against resilient fittings 43 forming abutments, which are secured to the cross member 37. The carriage 40 comprises two L-shaped bodies 42 connected together by cross members 44 (FIGURES 3 and 13), 45 and 46 (FIGURE 3). A detachable plate 47 (FIGURES 1, 2, and 3) forms an end wall and connects together the two bodies of the carriage which also supports the detachable platform 14.

The left-hand body 42 of the carriage is provided (FIGURES 2 and 3) with a handle 49 by means of which the carriage can be manually pulled towards the front of the machine, into the loading position (FIGURE 2), in which position it is maintained by a latching system. For this purpose, the carriage 40 is provided (FIGURE 3) with a dog 50 which, when the platform is advanced, engages in a hook 51 (FIGURES 3 and 13) and maintains the said platform 14 in the said advanced position, which is illustrated in dash-dotted lines in FIGURE 3. The hook 51 is connected to a pedal 52 which is adapted to pivot about a fixed pin 53. A spring 54 forces the lever 64 of the said pedal against a fixed abutment 55, which determines the normal position of the hook 51 (FIGURE 13).

Each L-shaped body of the carriage 40 is provided at

the top with a lug 57 (FIGURES 2 and 3) to which there is pivotally connected one end of a connecting rod 58, the other end of which is pivotally connected to a lever 60 adapted to pivot about a fixed pin 61 (FIGURES 3, 4 and 5). A lever 60 is disposed on either side of the carriage 40 and the said levers are connected together by a movable flap 63 (FIGURES 1 to 5).

The drum unit 18 comprises internally (FIGURES 3 to 5) a frame 65 which pivots about the pin 41 and supports the character drum 67, its motor and the inked ribbon 68 supported by rollers 69 and 70, and guided by rollers 71 to 74 (FIGURES 3 to 5) which guide it in the immediate neighbourhood of the drum.

The paper is guided in the printing device by fixed plates 80 to 84 (FIGURES 4 and 5). A guide plate 76 connected to the unit 18 is mounted on the levers 78 pivoting about pins 79. The plate 76 is provided at its ends with abutments 77 which rest on the plate 81, there remaining between the two plates a clearance for the passage of the paper P (FIGURES 4 and 5). A casing 75 protects the elements contained in the unit 18.

Braking blades 90 are mounted on a bar 91 (FIGURES 4 and 5) which is adapted to pivot about its axis. Two levers 92 and 93 are rigidly connected to the bar 91. A spring 94 secured on the one hand to the lever 93 and on the other hand to a tension adjusting system comprising a screw 95 and a nut 96 strongly applies the lever 92 (FIGURE 5) against an eccentric cam 97 keyed on a pin 98. A lever 99 accessible from outside the machine (FIGURES 1 and 2) is keyed on the pin 98 and enables the position of the cam 97 to be manually adjusted. A brake device (not shown) acting on the pin 98 maintains the cam in the position in which it has been manually placed. The position imparted to the cam 97 determines the deflection of the braking blades 90 (FIGURE 5) and the pressure exerted by these blades on the paper P. The positioning of the lever 99 thus determines the braking and the tension of the paper in the printing device. The plate 80 against which the paper is pressed by the blades 90 is fixedly mounted on a member 89 which is very rigid and is fast with the frame 66 of the part 17 of the machine.

In the printing device, the striker hammers 103 are disposed along a line 100 called the printing line and are guided in a support 104 which is rigidly fast with the part 17 of the machine, opposite the character drum 67, which is in the part 18 (FIGURES 4 and 5).

The striker hammers are adapted to be selectively actuated by electromagnetic devices which are distributed in two rows 101, 102 situated on either side of the printing line.

In leaving the printing device, the paper P passes over an auxiliary driving roller 105 (FIGURES 1 to 7) which, during the operation of the machine, is driven with a continuous rotational movement by a motor 106 through a belt 107, which is in engagement with the said motor (FIGURES 3, 5, 8 and 12). The linear surface speed of the roller 105 is in principle at least equal to the maximum linear speed reached by the paper in the course of its feed advance movement under the action of the traction members, in the interval of time between the printing of two successive lines. On leaving the traction members, the paper passes over a fixed, curved plate 109 (FIGURES 1, 3 and 6) and then re-descends by gravity, behind the machine (FIGURE 3) towards devices (not shown) for receiving the printed web.

The machine illustrated (FIGURES 1, 2, 6 and 7) is provided with two sets of traction members, each set comprising two traction members, the combined action of which is in practice necessary for ensuring correct feed advance of a paper web in a rapid printing machine. In slower machines, a paper web may be driven by a single traction member engaged in the marginal perforations in only one edge of the paper web. The machine illustrated in FIGURE 1 is provided with two paper webs and FIG-

FIGURE 7 shows an arrangement of the driving traction members for the two webs. Each traction member is provided with a studded chain 28 (FIGURES 5 and 7) which passes over two wheels 85 and 86 (FIGURE 5). The driving wheel 85 is driven by way of a key 87 (FIGURE 7) engaged in the groove 88 (FIGURES 5 and 11) in a driving bar (23 or 27, FIGURE 7). The wheels 85 and 86 are guided in a support block 113 (FIGURE 11), in which there is fitted a screwthreaded sleeve 114 which slides on a support bar (112S or 112I, FIGURE 7). The sleeve 114 is formed with a screwthread 115, on which there is engaged a nut 116 on which there is mounted a knurled ring 125 and which is provided with a collar 117 engaged in a locking ring 118, which is also adapted to slide on the support bar. A screw 119 provided with a knurled knob 124 is engaged in the locking ring 118 and enables the latter to be locked in a predetermined position on the bar 112. A ring 120 and a spring 121 are disposed in the traction members so as automatically to take up the play of the screw-nut system. The position of each traction member in the machine is readily observable by means of a pointer 122 moving over a graduated scale 123S or 123I (FIGURE 7). When a traction member is held fast on its bar in a chosen position, this position can be adjusted with precision by turning the knurled ring 125 of the nut 116 in one direction or the other. By means of this adjustment, the position of a traction member can be accurately adjusted in accordance with the paper to be driven.

Each of the bars supporting the traction members (112S or 112I, FIGURES 6 and 7) is guided at its ends in rings 127-128 fitted in cheeks 129 and 130 disposed on either side of the paper driving mechanisms. The right-hand end of the support bar 112I is connected (FIGURE 10) by a pin 131 to two plates 132 adapted to pivot about a fixed pin 133 engaged in a support 134 fixedly mounted on the cheek 129. A stud 135 connected to the plates 132 is engaged in a curved groove 136 in a toothed sector 137 which is adapted to pivot about a pin 138 connected to the fixed support 134. The teeth 140 of the sector 137 are engaged in the teeth of a pinion 141 mounted on a pin 142 which is adapted to turn in the fixed support 134 and on which there is keyed an operating knob 143I accessible from the outside through an embellisher 144 and provided with a braking device.

The shafts 23 and 27 which drive the upper and lower traction members respectively (FIGURES 6 and 7) are each driven by a mechanism for the programmed feed advance and line shift of the paper, the general principle of which is known, and which serves for automatically making up the printed data into pages. The mechanism driving the shaft 27 comprises (FIGURES 8 and 9) a shaft 150 on which there is keyed a toothed pinion 152 meshing with a toothed belt 151 driven in known manner from a motor 153 (FIGURE 3) and through magnetic clutches or the like whose operation is controlled by control pulses received by the machine and programme indications supplied by the scanning of a punched tape 154 (programme tape) which travels through a reading device 155 as a function of the feed advance of a form through the printing device. The programme tapes are readily interchangeable. These devices could be analogous to those disclosed in the J. H. Bakelaar et al. U.S. Patent 2,684,746 issued on July 27, 1954, and particularly column 4, lines 1-32 with reference to FIGURE 1 of that patent. The shaft 150 is coupled to the shaft 27 through a reduction gearing consisting of a pinion 156 keyed on the shaft 150 and meshing with a pinion 157 keyed on an intermediate shaft 158 mounted in a support block 159 (FIGURES 7 and 9) movable about the shaft 150. A pinion 160 keyed on the shaft 158 is in engagement with a pinion 161 keyed on the shaft 27 which drives a set of traction members. The movable block 159 is externally provided with a toothed ring 162 in engagement with a pinion 163 which is adapted to turn about a fixed

pin 164. The pinion 163 is in engagement with a pinion 165 turning about a fixed pin 166 and connected to a knurled button CLI accessible from the outside through the aperture in an embellisher 145. An adjustable brake 167 mounted on the pin 166 of the button CLI prevents the device from being rotated by the reaction of the shaft 158 on the block 159 when the shaft 27 is driven by the shaft 150. A similar device controls the driving of a shaft 23 independently of the shaft 27 (FIGURES 3 and 7). Concerning the arrangement of control push buttons 20, 24 and 30 mentioned above, analogous dispositions may be seen in the U.S. Patent 2,684,746 herein above-mentioned.

Paper loading

When the machine is inoperative and in the position illustrated in FIGURE 1, but without paper, an operator situated in front of the machine grips the handle 49 and pulls it towards him. Under this action, the carriage 40 is advanced and, at the end of its travel (FIGURE 2), the dog 50 (FIGURE 3) engages under the catch 51 and the carriage 40 is retained in the position illustrated in FIGURE 2 and in dash-dotted lines in FIGURE 3.

The advance of the carriage 40 is accompanied by a movement of the movable flap 63, which is connected thereto by the connecting rods 58 (FIGURE 3) and which also passes from an "in" position (FIGURES 1 and 3) to an "out" position (FIGURE 2). In FIGURE 3, the carriage 40 and the flap 63 are shown in side view and in solid lines in the "in" position, while they are shown in dash-dotted lines in this figure in the "out" position. FIGURES 4 and 5 illustrate a part of the printing device in section. In FIGURE 5, the flap 63 is in the "in" position, while in FIGURE 4 the said flap is in the "out" position.

The lever 60, which is connected to one end of the flap 63, is provided (FIGURES 4 and 5) with a dog 62 which, when the carriage 40 is advanced (FIGURE 4), encounters the lever 93, pushes the latter, turns the bar 91 and lifts the braking blades 90 so as to free the passage for the paper between the guide plates.

The platform 14 which receives the paper loads is provided (FIGURES 1 and 2) with graduations 48 by means of which each paper load can be disposed on the platform in a position corresponding to the position of the printing devices which are to print in the columns of the forms on the said paper. In order to introduce paper into the printing device, the beginning of the tape is laid on the flap 63 and manually pushed as indicated in FIGURE 4. The braking blades 90 being lifted, the paper P can pass freely between the guide plates and between the inked ribbon 68 and the row of hammers 103 of the striker mechanisms.

The paper loading operation can be normally effected, the unit 18 being closed (FIGURES 1 and 4). Graduations provided on a straight scale 56 secured on the guide plate 83 (FIGURES 4, 5 and 6) enable the registration of the columns of the paper in relation to the printing mechanisms to be visually verified.

On leaving the guide plates 82 and 83, the paper passes over the roller 105 (FIGURE 5) and the marginal perforations in the said paper engage in the studs on the driving chains of a set of traction members previously positioned on a support bar, in accordance with the position and the width of the paper to be driven (FIGURE 7). A part of the paper web passes (FIGURE 3) over the curved plate 109 and then descends into the paper-receiving devices disposed behind the machine as indicated in the foregoing. When the paper has been appropriately centered in the printing device and in the driving mechanisms, the pedal 52 (FIGURES 1, 2, 3 and 13) is depressed. The hook 51 is lifted, the dog 50 (FIGURE 3) is disengaged from the said hook and the carriage 40, which is released, returns by gravity to the "in" position (FIGURES 1 and 3). In the downward movement of the carriage 40 in the machine, the flap 63 is also moved in-

wards, the dog 62 of the lever 60 releases the lever 93 and the braking blades 90 apply the paper P (FIGURE 5) against the fixed plate 80 under the action of the spring 94. The paper being tensioned in the machine, the latter can then be started for printing with a tension determined by the position imparted to the cam 97.

Adjustment of the register of the paper

When the machine is printing, it is sometimes found that the printed data are not perfectly registered on the lines or in the columns of the forms which have been previously printed on the paper. The machine is provided with adjusting means accessible during the operation and visible in FIGURE 6. A knurled button CLS to the left of the figure enables the printing lines to be registered on a paper web driven by the upper traction members, while a button CLI enables the printing lines to be registered on a paper web driven by the lower traction members. These two devices are similar. Each button can be manually turned either in the direction of the paper feed advance or in the reverse direction, in order to advance or retard the movement of the said paper in relation to the printing. In FIGURE 9, the button CLI for registering the lines of the paper driven by the lower traction members is mechanically coupled through the pinion 163 to the support block 159, on which is mounted the intermediate shaft 158 of the reduction gearing, so that this support block 159 turns about the shaft 150 in the direction in which the button CLI is manually moved. Under these conditions, owing to the difference of the diameters of the pinions 157 and 160 (and of the pinions 156 and 161), the movement of the shaft 158 about the shaft 150 advances or retards the rotation of the shaft 27 in relation to the shaft 150 as a function of the extent and direction of the movement imparted to the said shaft 158. This makes it possible for the register of the lines printed by the machine on the lines of the forms to be accurately adjusted.

The device for the registration of the lines by means of a differential enables the adjustments to be continuously carried out without limitation, whether this be for a fraction of a line or for several lines.

The buttons 143S and 143I (FIGURE 6) permit the adjustment of the register of the printing in the columns of the paper driven by the upper traction members and in the columns of the paper driven by the lower traction members respectively by simultaneously displacing the upper traction members or the lower traction members either to the right or to the left. In the column adjustment mechanism of the lower traction members (FIGURE 10), a displacement to the right of the upper part of the button 143I produces a displacement, to a reduced scale, towards the right of the bar 112I on which the lower traction members are secured.

It will be noted (FIGURE 6) that the means for the adjustment of the register of the lines and columns are so arranged as to be easy to operate, that is to say, they are so arranged as to take account of the motions which the operator would instinctively perform in order to modify these adjustments, movement of the button CLS (FIGURE 6) in the direction of displacement of the paper accelerating the movement of the paper driven by the upper traction members, while movement of the button CLS in the opposite direction retards the movement of the said paper. The button CLI controls under the same conditions the register of the paper moved by the lower traction members. The button 143S displaces the upper traction members to the right or the left, while the button 143I renders possible the same adjustment for the lower traction members. Consequently, the time necessary for learning to perform these operations without danger of errors is very short and the danger of false manipulation during the operation of the machine is minimised.

Auxiliary paper drive

In high-speed printing machines, the feed advance of a paper web is generally necessarily effected by means of two sets of traction members. A first set of traction members disposed at the inlet of the printing machine pulls the paper coming from the paper load and a second set of traction members disposed downstream of the printing mechanism pulls the paper engaged in the said mechanism and forces it towards the receiving devices. The paper tension necessary in the printing mechanism can be ensured in a number of ways. In some cases, the paper is stretched between the inlet and outlet traction members. This arrangement is difficult to employ, above all by reason of the variations of the spacings of the perforations in the paper. In order to avoid damage to the said perforations, it is necessary to provide some slack in the paper which is harmful to the precision of the register of the printed lines. Moreover, the combined mechanisms for adjusting the paper tension and the register of the lines are of complex construction and awkward to use.

In a second method, the paper is stretched between the set of outlet traction members and a paper braking device situated at the inlet to the printing mechanism. This braking must be sufficient at high speeds to stabilise the position of the printing line on the paper. The paper web is maintained slack between the braking device and the inlet traction members for the paper. All these driving devices have a serious disadvantage which arises above all when wide paper webs are employed. It is found in this case that, since the traction members act on the paper only by way of the marginal perforations, the central portion of the web is driven by an oblique action of the traction members on the perforations and the latter are frequently damaged or must be reinforced by a special treatment of the paper. A particular feature of the invention obviates these disadvantages and renders possible the use of ordinary paper even at high speeds, while considerably reducing the danger of damage to the perforations. In FIGURE 5, the paper web P leaving the printing mechanism passes over the roller 105, which is in continuous rotation during the operation of the machine, and thereafter enters the studded chains of a set of traction members. The paper is normally tensioned in the printing mechanism under the action of the driving traction members, on the one hand, and under the braking action of the blades on the other hand. To the extent to which the paper is stretched on the roller 105, the said paper is driven by friction by the latter over its entire width, until the tension of the paper between the set of traction members and the braking blades is no longer sufficient to bring about the drive of the paper by the friction of the roller.

Consequently, it will readily be appreciated that, as soon as the traction members are set in operation in order to advance a paper, the latter is stretched on the roller 105, which exerts over the entire width of the paper a driving action which is added to that of the traction members, whereby the action of the said traction members on the marginal perforations in the paper is reduced.

What I claim is:

1. In a printing machine, a device for advancing in one advance direction a paper web provided with marginal perforations through a printing mechanism, said device comprising in combination: a pair of web driving mechanisms disposed, with respect to said advance direction, after said printing mechanism, and being provided with studs engaged in perforations of the web to drive it; means for intermittently actuating said pair of driving mechanisms; web braking means located, with respect to said advance direction, before said printing mechanism and directly engaging said web to brake it by friction; an auxiliary driving roller located between said printing mechanism and said pair of driving mechanisms to define an angled feed path for said web; and means for driving

said roller in continuous rotation with a peripheral velocity at least equal to the maximal speed of said web when said driving mechanisms are actuated, a portion of the periphery of said roller adding a frictional driving force to said web as long as the latter is tensioned by said actuated driving mechanisms.

2. An advancing device according to claim 1 wherein said web braking means comprises a bar mounted on one side of the web path to pivot about an axis parallel to said printing mechanism, said bar bearing a plurality of blades extending radially and a lever integral with the bar; a fixed plate located on the other side of the web path; and manually settable camming means acting as an abutment for said lever so that the ends of said blades apply an adjusted pressure to said web against said plate in one position and the ends of said blades liberate the web in another position.

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