

May 7, 1940.

F. M. CARROLL
PAPER FEEDING DEVICE

2,199,556

Filed Oct. 7, 1938

5 Sheets-Sheet 1

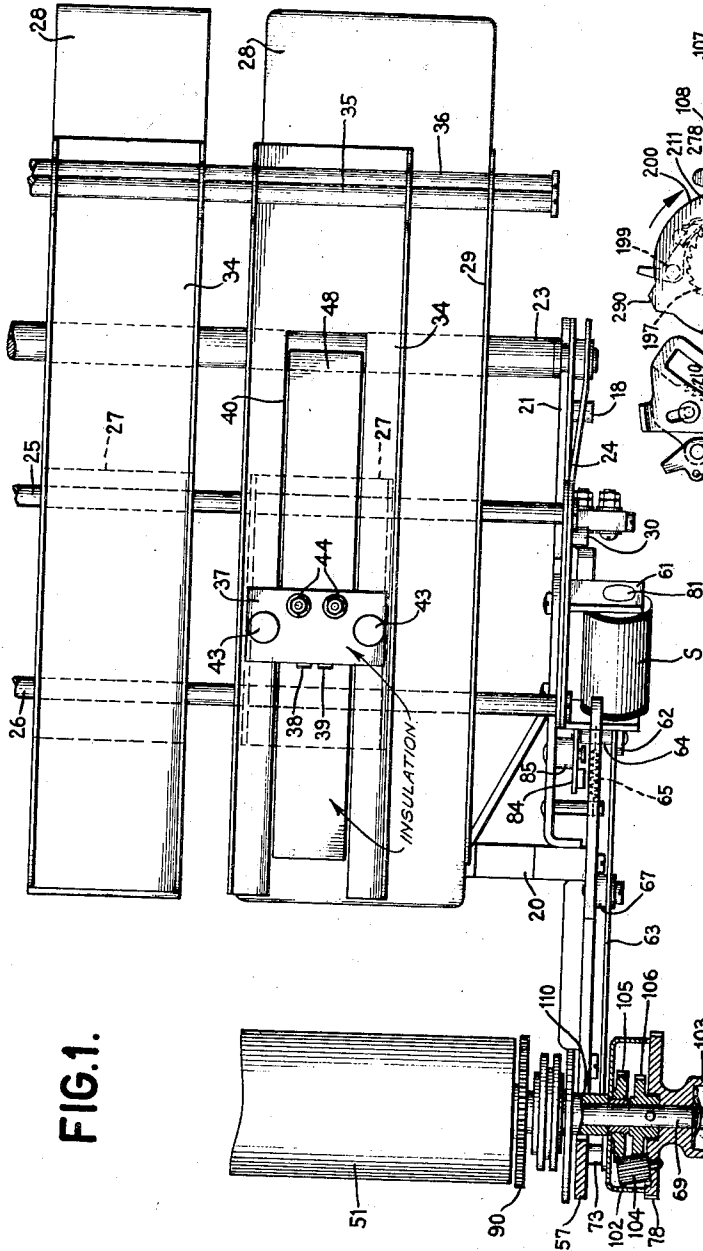


FIG. 1.

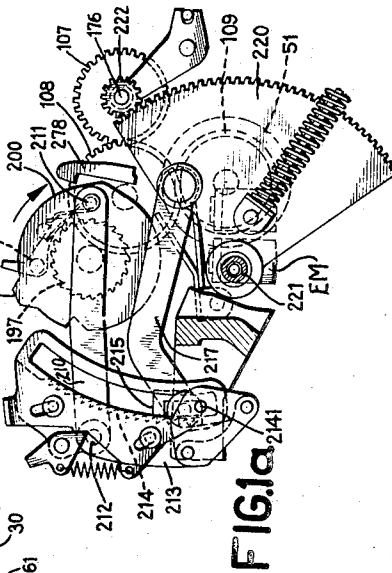


FIG. 1a.

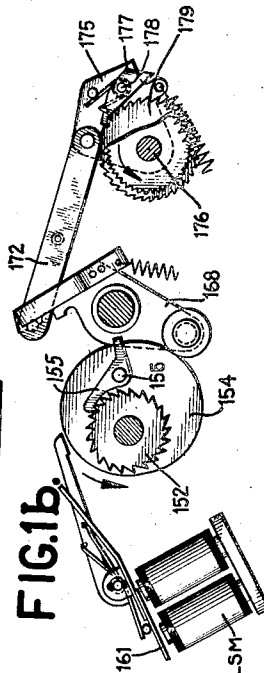


FIG. 1b.

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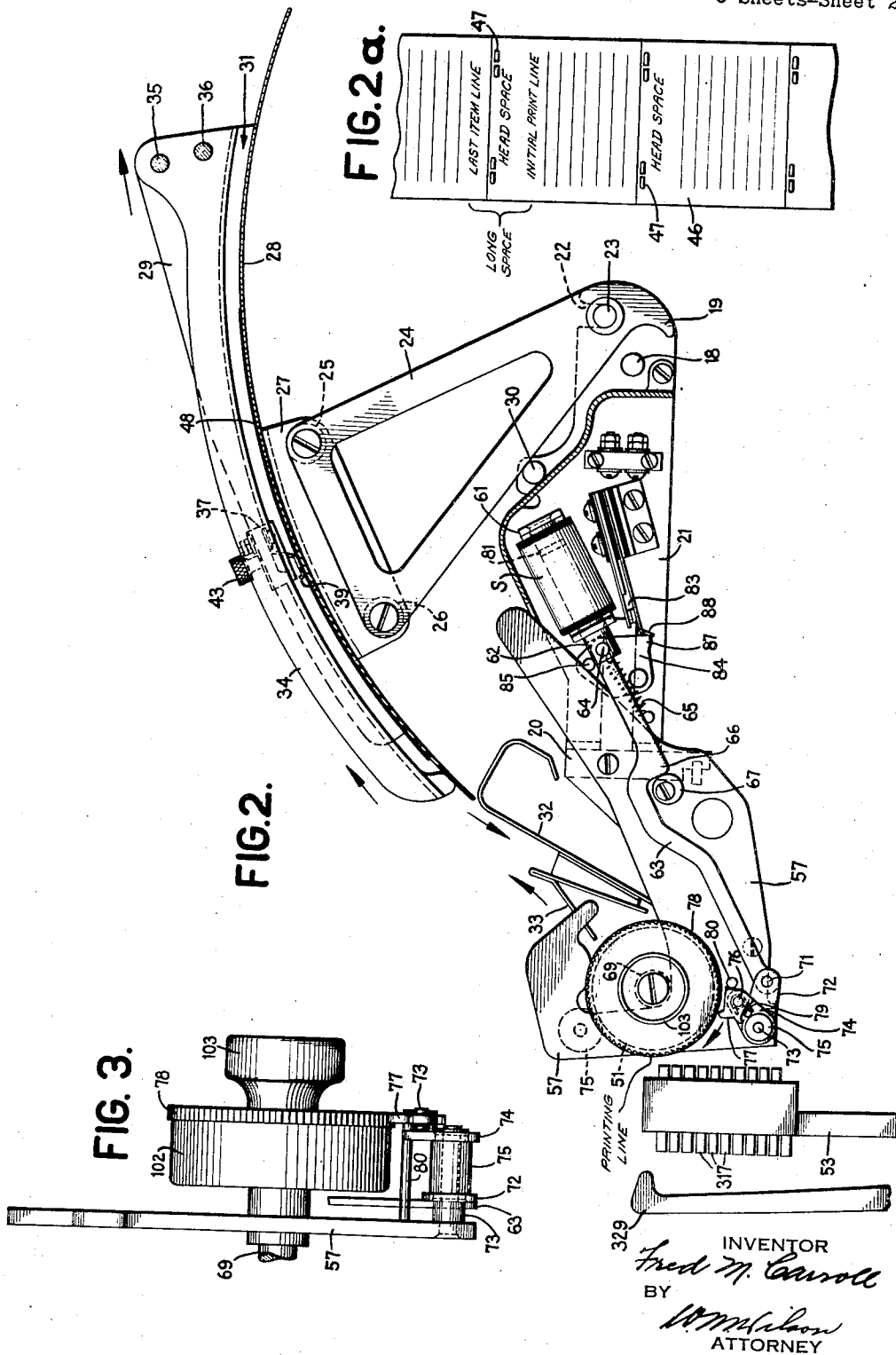
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5 Sheets-Sheet 2



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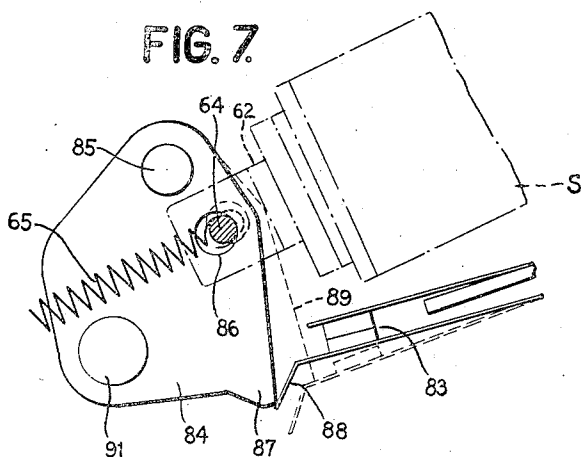
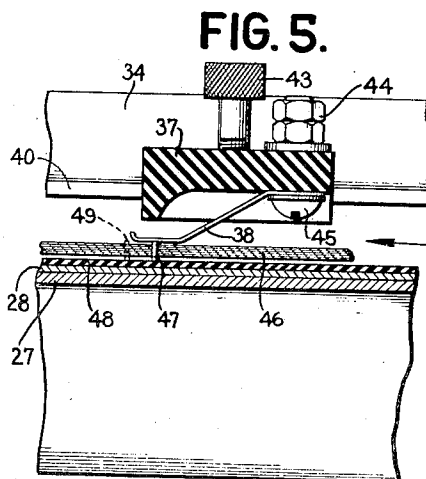
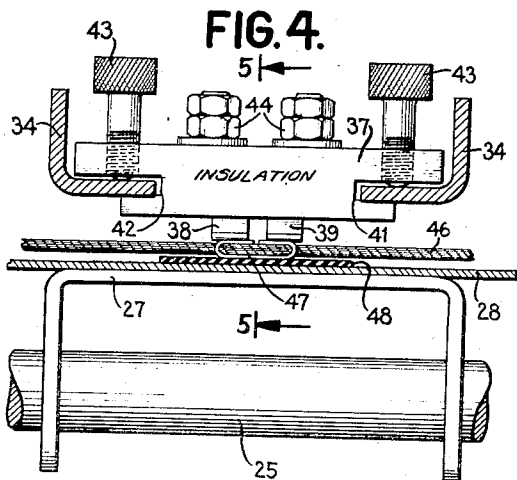
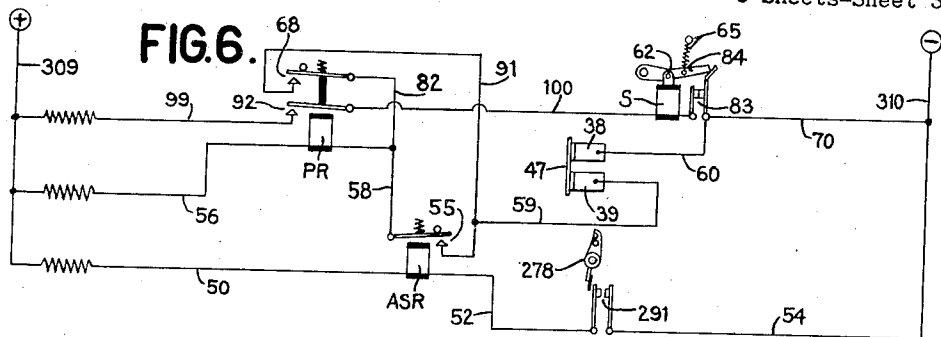
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5 Sheets-Sheet 3



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5 Sheets-Sheet 4

FIG. 8.

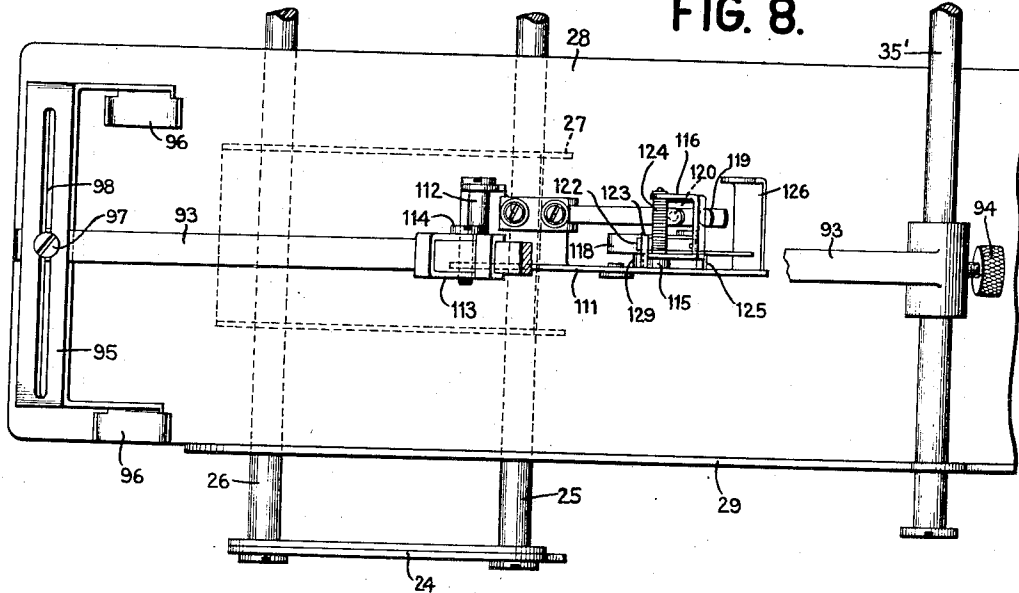


FIG. 9.

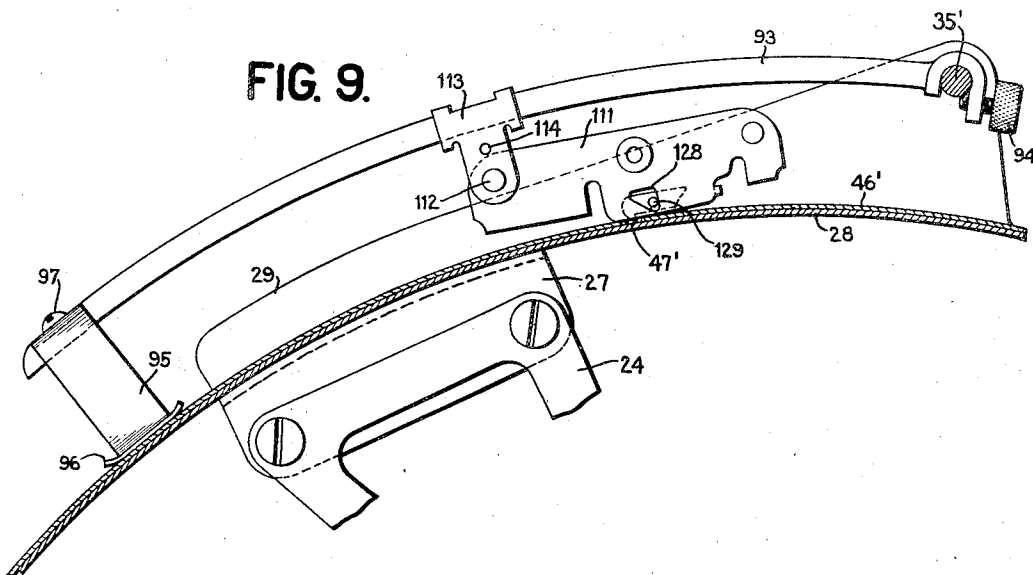
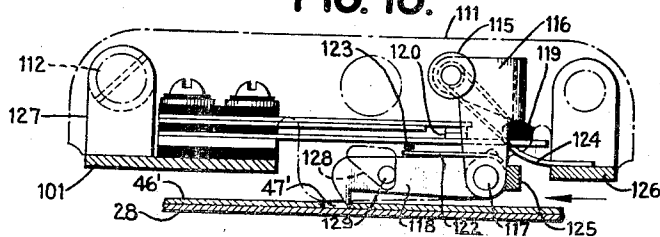


FIG. 10.



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5 Sheets-Sheet 5

FIG. 11.

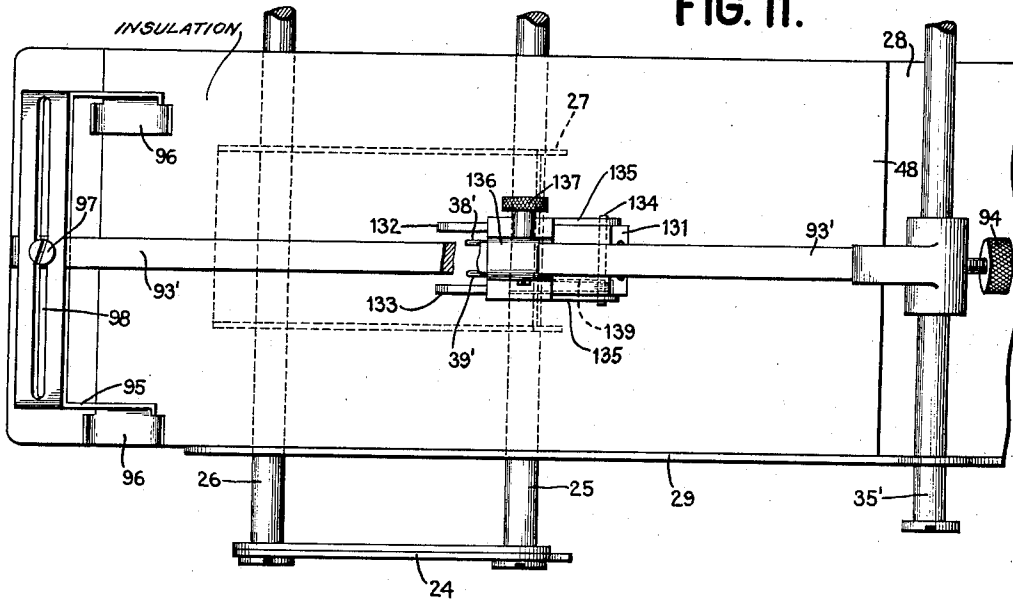
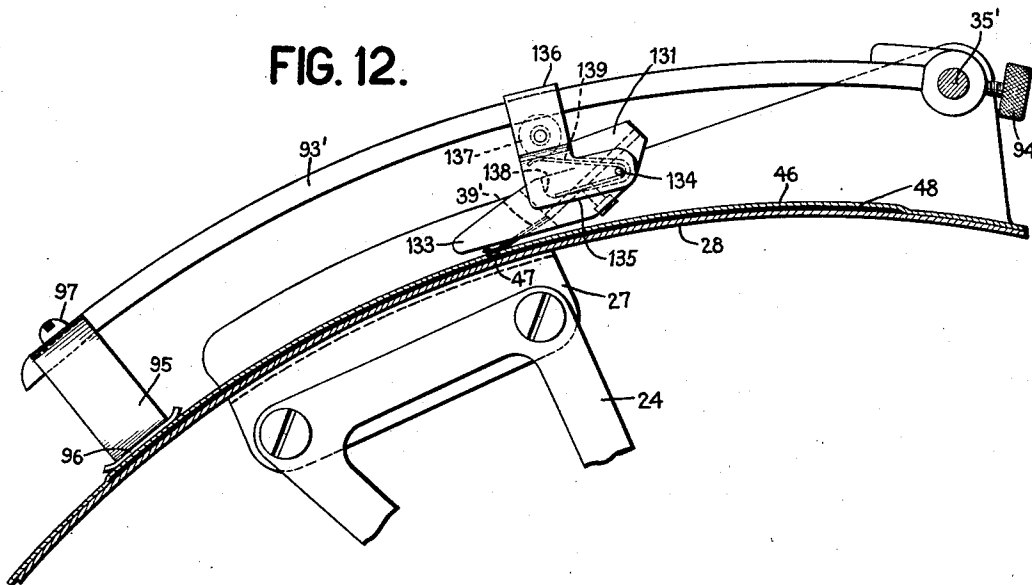


FIG. 12.



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UNITED STATES PATENT OFFICE

2,199,556

PAPER FEEDING DEVICE

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Application October 7, 1938, Serial No. 233,736

17 Claims. (Cl. 197—133)

This invention relates generally to paper feeding devices, and more particularly to auxiliary feeding means for correcting the position of record sheets before printing.

The connected forms of a continuous record sheet are usually pre-printed with headings which are to be skipped when listing items on sheet forms. For the purpose of skipping such portions of the forms, a long-feeding or ejection operation is initiated when a total or last item is printed at the bottom of a form. Devices for producing such long feeding operations are illustrated in U. S. Patents 2,066,029 and 2,066,305. It is important that the continuous sheet be brought to an accurate position before printing the first item on a form, especially on ruled forms where the ruling lines would interfere with inaccurately positioned characters. The devices of the present invention are devised to bring the record sheet into the correct initial printing position when called into action at the end of each long feed operation.

An object of the present invention is to provide means for sensing the position of feed control indicia such as staples connecting manifold sheets of continuous forms, and devices controlled by said sensing means for shifting the forms into a correct printing position.

Another object of the present invention is to provide controls for delaying the operation of auxiliary feed devices until printing is about to be initiated.

A further object of the present invention is to provide sheet positioning devices which are called into operation only at the end of a long feeding operation.

Another object of the invention is the provision of paper spacing operating means connected to the plunger of a solenoid, with an automatic circuit breaker for initiating successive operation of the solenoid to cause rapid successive operation of the spacing means.

A feature of the present invention is the provision of an alternative sheet position sensing device in the form of a contact opening member that engages a feed control indicia in the form of a perforation in the sheet. The contact is arranged in series with the auxiliary feed solenoid so that the solenoid is operative to cause sheet feeding until the positioning perforation is engaged by the contact opening member.

Further objects of the instant invention reside in any novel feature of construction or operation or novel combination of parts present in the embodiment of the invention described and shown

in the accompanying drawings whether within or without the scope of the appended claims and irrespective of other specific statements as to the scope of the invention contained herein.

In the drawings:

Fig. 1 is a plan view of the auxiliary feed devices.

Fig. 1a is a side elevation view showing the long feeding or ejection devices.

Fig. 1b is an elevation view of the line spacing devices.

Fig. 2 is a side elevation view of the auxiliary feed devices.

Fig. 2a is a detail view of a portion of the manifold record sheets held together with staples.

Fig. 3 is a detailed view in front elevation showing the operating pawl and ratchet of the auxiliary feeding devices.

Fig. 4 is a sectional view showing the staple sensing devices.

Fig. 5 is a sectional view taken along the lines 5—5 in Fig. 4.

Fig. 6 is a wiring diagram of the electrical controls connected with the operating solenoid.

Fig. 7 is a detailed view of the make and break contact associated with the feed solenoid.

Fig. 8 is a plan view of an alternative perforation sensing feed controls.

Fig. 9 is a side elevation view of the alternative sensing controls.

Fig. 10 is a detailed view of the perforation sensing and contact opening devices.

Fig. 11 is a plan view of another alternative staple sensing means including a pair of sensing brushes.

Fig. 12 is a side view of the sensing brushes.

Referring to Figs. 1 and 2, it is noted that a platen 51 is mounted on a shaft 69 and suspended from carriage side frames 57. The side frames 57 are connected to the main carriage frame 20 to which there is also attached a side frame 21, carrying the auxiliary feed devices. The side frames 21 (the left one of which is not shown) are notched at 22 to locate a grooved shaft 23 connected between a pair of triangular paper supports 24. A pair of shafts 25 and 26 are connected to the opposite ends of the supports 24 to form a supporting means for brackets 27, which are secured to the bottom of the record sheet supports 28. Turning to Fig. 1, it is noted that a plurality of such supports 28 are provided to support the record sheet as it is fed down to and around the platen 51. The end support 28 is formed with a side piece 29 for confining the record sheets in position laterally.

A stud 30, Fig. 2, is mounted on side frame 21 in position to contact the side of the paper support 24 so that the guides 28 are positioned to direct the record sheets as indicated by the arrows on Fig. 2. Another stud 18 cooperates with a tailpiece 19 on support 24 to stop the sheet holding unit when it is swung away from the platen. The sheet is threaded into the guides at 31, and carried to the left, down over the vertical guide 32, and then down and around the platen 51, and up over the table 33, and along the upper edges of a series of movable sheet return supports 34. These sheet supports 34 are mounted on a pair of shafts 35 and 36, located in the side pieces 29 of the support members 28. In Fig. 1, it may be noted that the supports 34 are shaped in the form of a U with the sides perforated to receive the shafts 35 and 36 and slide along these shafts to be positioned laterally wherever necessary to support the rearwardly moving web of the printed record sheets.

One of the supports 34 is formed with a slot 40 to provide an adjustable mounting for the holder 37 of the staple sensing contact members 38 and 39. The slot 40 is of such width that the grooves 41 and 42, Fig. 4, of holder 37 fit therein and engage the paper guide 34, but free thereon to be moved back and forth until correctly positioned, and then secured into that position by means of thumb screws 43.

In Fig. 5, the sensing members 38, 39 and the insulation support 37 therefor are shown with the lower part of the support 37 cut out with a recess that receives the upper ends of the sensing members, and these ends are attached to the support by means of screws 45, leading to wiring terminals 44. In this view it is seen that the set of record sheets or continuous forms 46 is so positioned that the staple 47 thereon is directly under the lower flexible end of the contact members 38 and 39. A strip of insulation material 48, separates the staple from the top of the paper guides 28. Referring to Fig. 1, it may be seen that the strip of insulation 48 is long enough so that the sensing members may be moved to any position along slot 40, depending upon the relative position between the staples and the first line of printing, without contacting guide 28. Turning again to Fig. 5, it is noted that the direction of feed of the record sheets 46 is from right to left, and that when the sheets are fed to the correct printing position for the first line, the staple will assume the dotted position 49. However, if a long feed operation fails to bring the record sheets up to the correct position, then the staple will be brought under the sensing members to establish a circuit as shown, and initiation of the operation of the auxiliary feed is called into play electrically, and the sheets will be fed from right to left until the staple is moved over to the position 49, thus breaking the circuit between the contact members and stopping operation of the auxiliary feed.

During ordinary paper feeding operation, the record sheets are moved by one of two different feeding means, a line-spacing means, or a long feeding device such as those illustrated in Figs. 1b and 1a, respectively. These devices are described in detail in the patents mentioned hereinbefore and in copending application Serial No. 1, filed January 1, 1935, so that for the present purposes it will only be necessary to give a general outline of the mode of operation employed in each case.

Referring to Fig. 1b, it is seen that when a

line space magnet LSM is energized, its armature 161 is rocked to release a pawl 155 which then engages a constantly rotating ratchet gear 152. Since pawl 155 is secured to cam 154, this cam is then connected for rotation, and serves to operate a bell crank 168 in a counterclockwise direction. Associated with the upper end of the bell crank is one end of a link 172 which is pivoted at the right to a rocking frame 175 loosely fulcrumed on the platen operating shaft 176. A pawl 177 pivoted at 178 on frame 175 cooperates with a ratchet gear 179 attached to the operating shaft 176, so that when the parts are rocked by the cam, a line space movement is imparted to the shaft 176 which controls the platen feed.

The long feed devices, illustrated in Fig. 1a, are also designed to influence the movement of shaft 176, and turn it an amount sufficient to feed the sheets, eject a form and skip the heading space as shown diagrammatically in Fig. 2a. An operation of these devices is initiated by the energization of an eject magnet EM. This magnet is activated when the last line of a form is reached, or when the total is printed on a form. Then its armature releases the clutch pawl 199 so that it may engage the constantly rotating ratchet wheel 197. Since pawl 199 is attached to cam plate 200, this plate is turned through one revolution in a clockwise direction each time the magnet is energized. Mounted eccentrically on pivot 211 on the side of plate 200, is one end of a link 210, which at the left end is pivoted on a stud 212 on an oscillating operating frame 213, pivoted at 2141 on the side frame of the carriage. This oscillating frame 213 is provided with a plurality of operating teeth, 214, adapted to engage teeth in a block 215 suspended on the end of an operating link 217 connected to a gear segment 220 pivoted at 221. Meshing with the teeth on segment 220 is a pinion 222 fastened to shaft 176. This shaft also carries a gear 107 which is in engagement with an idler gear 108 which in turn meshes with a gear 109 fastened to the platen 51. By means of these connections, each time the cam plate 200 is rotated, the operating frame is rocked in a clockwise direction and through link 217, gear segment 220 is rocked in the same way to turn the gearing and rotate the platen, so that the record sheets thereon are fed through a distance long enough to carry it from the last line of one form to the first item or address printing line of the following form.

At the end of each ejection operation of the long feed cam 200, a cam extension 290, Fig. 1a, strikes a contact closing member 278 to close contacts 291 (Fig. 6) and render effective the staple sensing devices in a manner to be described more fully hereinafter, with reference to the wiring diagram in Fig. 6.

When the long feeding operation is finished, the record sheets 46 are then positioned as shown, Fig. 5, with the staple 47 at some point under the sensing members 38 and 39. It is then necessary to call the auxiliary feeding devices into play to feed the record sheets further so that the staple assumes the correct starting position 49 before printing is initiated.

When the long feeding operation is terminated, and the staple 47 is sensed by the sensing members (Fig. 5), then the solenoid S, Fig. 2, is energized to operate the auxiliary feeding devices. This solenoid S is mounted on a bracket 61, attached to the side frame 21. In the coil of the solenoid there slides a plunger 62 which is slotted

at the lower end to receive one end of a link 63. A pin 64 is fastened between the plunger and link to form a pivotal connection where the two parts meet. Attached to this stud 64 is a spring 65 which tends to pull the plunger 62 out of the solenoid and, at the same time, force a shoulder 66 on link 63 against an adjustable eccentric stop 67, held on side frame 57 by means of a screw.

The lower end of link 63 is loosely pivoted at 71 on the end of an arm 72, loosely pivoted on a stud 73, fastened on the side frame 57. Arm 72 is joined to another arm 74 by means of a collar 75. Thus, the two arms are connected to operate as a bell crank when moved by link 63. At the upper end of arm 74 there is pivoted at 76 an operating pawl 77 which is designed to engage teeth 78, formed on the periphery of a disk formed on the platen adjusting knob 103. A coil spring 79 is wound around pivot 76, and presses against pawl 77 to urge it in a clockwise direction toward the teeth 78. However, when the parts are in the normal position, the side of pawl 77 abuts against a pin 80 extending from the side of frame 57. This pin holds the pawl out of engagement so that the ordinary platen moving operations may be performed when the auxiliary correction feeding devices are not in operation.

Each time the solenoid S is energized, the plunger 62 is drawn to the right, Fig. 2, against a stop 81, fastened in the end of the solenoid coil. This movement is imparted to the link 63 which then rocks the arms 72 and 74 in a counterclockwise direction, moving the pawl 77 away from the stop pin 80, and allowing it to engage the ratchet 78 so that the connected gearing may turn the platen 51 a slight amount in a clockwise direction to feed the record sheet. This movement is carried on against the tension of spring 65 so as soon as the solenoid is deenergized, the spring acts to pull the plunger and link 63 towards the left until shoulder 66 abuts against the stop 67. As the parts are restored by the spring, pawl 77 strikes against pin 80 and rocks counterclockwise on pivot 76 to be disengaged from the ratchet teeth 78.

Successive energization and deenergization of solenoid S is carried on by the opening and closing of contacts 83 operated by a member 84, connected to the solenoid plunger 62. In Fig. 7, it is seen that this member 84, which is pivoted at 85 on the frame 21, is formed with an opening 86 encircling the stud 64 fastened to the solenoid plunger 62. The lower end of member 84 is formed with a projection 87 cooperating with a cam face 88 on the lower blade of the contacts 83. The arrangement is such that when the plunger 62 is drawn towards the right by energization of solenoid S, member 84 is rocked in a counterclockwise direction about pivot 85, and assumes the dotted line position 89 wherein the lower contact blade is cammed down by projection 87 so that contacts 83 are opened. Since these contacts are in series with solenoid S, this magnet is immediately deenergized and then spring 65 is effective to pull the plunger 62 towards the left and rock member 84 in a clockwise direction so that projection 87 moves out of the path of cam face 88 whereupon contacts 83 close so that the solenoid S is again energized. The member 84 is provided with a weight 91, and opening 86 is proportioned in a larger diameter than the stud 64 so that angle of operation member 84 may be wider than the movement of the operating stud 64. The inertia of the weight

91 tends to make the member 84 overthrown and swung further than the movement of stud 64, and in this way bring the opposite side of the opening against the stud so that full advantage is gained to partake of the movement of the stud. Successive energization of solenoid S is carried on by the automatic opening and closing of contacts 83 in series therewith, as long as the staple 47 is positioned under the sensing members.

The wiring diagram, Fig. 6, shows the electrical controls as they are wired to obtain successive operations of solenoid S as soon as a long feed operation is completed and as long as a staple bridges the sensing members 38 and 39. A pair of main lines 309 and 310 are connected to the power source, and wired in series between them are a control relay ASR and the contacts 291 operated by the long feed cam lever as explained hereinbefore. After a long feed, the record sheets 46, Fig. 2a, are positioned near the initial item print line, the staple 47, Fig. 5, is under the sensing members, and the contacts 291, Fig. 6, are closed to initiate operation of the solenoid for an auxiliary feed operation. The initiating circuit includes line 309, wire 50, relay ASR, wire 52, contacts 291, wire 54 and line 310. Then, the energized relay ASR closes associated contacts 55 in series with a solenoid power relay PR which is only energized if a staple 47 is contacted by sensing members 38 and 39 also in series therewith. If no staple is sensed, the auxiliary feed devices are ineffective, for then plain record sheets without staple connections are being fed through the machine by the ordinary feeding devices. However, assuming that a staple 47 is present and the record sheets are fed short of the required distance, then a circuit is closed through line 309, wire 56, relay PR, wire 58, contacts 55, wire 59, sensing member 39, staple 47, sensing member 38, wire 60, wire 70 and line 310. This circuit is closed only momentarily, until contacts 291 again open, but in the meantime, relay PR has closed contacts 68 to establish a holding circuit. The holding circuit includes line 309, wire 56, relay PR, wire 82, contacts 68, wire 91, wire 59, sensing member 39, staple 47, sensing member 38, and wires 60 and 70 to line 310.

Thus, the relay PR is made effective to close a contact 92 in series with the solenoid coil S and hold that contact closed as long as the staple is under the sensing members. The solenoid operating circuit follows a path from line 309, through wire 99, contacts 92, wire 100, solenoid coil S, contacts 83, wire 70 and line 310. As explained hereinbefore, every time the solenoid is energized, the swinging member 84 is operated to open contacts 83. This serves to break the solenoid circuit and then spring 65 is effective to withdraw member 84 and allow the contacts 83 to close again to energize the solenoid. The successive energization and deenergization of the solenoid, and the resulting record sheet feed by the devices including pawl 77, Fig. 2, continue as long as the staple 47 is touched by the sensing members. However, as soon as the sheets 46 are at the correct position wherein the staple 47 assumes the dotted position 49, Fig. 5, out of contact from the sensing members, relay PR is deenergized and contacts 92 are opened to deenergize the solenoid coil S and stop the auxiliary feed.

The correct printing line is a position on the platen 51, Fig. 2, directly opposite the pointed end of the hammer 329, which is activated after

the type bar 53 has positioned a type 317 in alignment therewith.

The gearing for conveying the movement of the ratchet and pawl 77, 78 (Fig. 2) to the platen 51 is shown in Fig. 1, and it is seen that knob 103 not only carries the ratchet teeth 78, but it also carries a pivot on which there is fulcrumed a pinion 104, tipped at an angle to cooperate with gears 105 and 106; the latter of which is pinned to shaft 69, the former being secured to a sleeve 110 attached to the platen 51. When the knob 103 is turned manually, or through operation of the ratchet teeth 78, pinion 104 rotates as a planetary gear while meshing with the two gears 105 and 106 which are so proportioned that 105 will turn with respect to 106 as pinion 104 travels around the gears. The movement of platen 51 is slight compared to the movement of knob 103 so that a plurality of operations of the ratchet 78 must be employed to get an appreciable variation of platen position. However, the corrective feed is brought about rapidly because the oscillation of the solenoid plunger is induced by the quick operation of contacts 83. In Figs. 8, 9, and 10, there is shown another form of record sheet position sensing means for controlling the operation of the feeding solenoid. These devices operate mechanically to sense the position of a perforation 47', Fig. 10, in a record sheet 46'. The perforation 47' takes the place of the staple 47 to control the same kind of auxiliary feed as that described hereinbefore. The edge of the perforation 47' is used to carry along a mechanical pawl with connections to open contacts when the record sheet reaches the correct printing position just as the staple 47 opens the relay circuit when positioned beyond the sensing members.

In Fig. 8, it is seen that the shaft 35' carries a forwardly extending square bar 93 which is formed with a cylindrical boss that is adjustably secured to the shaft by means of a thumb screw 94 threaded in said boss. The forward end of bar 93 is supported by means of a U-shaped bracket 95, formed with feet 96, resting on the record sheet 46' as it passes over the support 28. The upper part of the bracket sets in a notch cut into the upper part of the bar 93, and is adjustably secured thereto by means of a screw 97 which passes through a slot 98, cut along the middle of the upper part of the bracket.

A sensing device frame 111, Figs. 8 and 9, is suspended and pivoted at 112 on a holder 113 which is formed with a pair of extensions encircling the bar 93. The support 113 may be moved along bar 93 to carry frame 111 into any desired position, and there secured by tightening a screw 114 which clamps the opposite sides of the support 113 against the sides of bar 93. Carried on the frame 111 is a stud 115 on which there is loosely pivoted a bail 116, the side arm of which is extended downwardly, Fig. 10, and carries a stud 117, on which a pointed feeler finger 118 is pivoted. The end of this finger is designed to drop into the perforation 47', and be carried along by the edge of the perforation as the record sheet 46' is fed from right to left in Fig. 10. As the finger is drawn towards the left by the record sheet, stud 117 is carried along therewith and bail 116 is rocked in a clockwise direction about pivot 115. Then the lower edge of the cross bar on bail 116 is lowered, and it presses on an insulation block 119 which is fixed on top of the lower blade of a pair of contacts

120. These contacts are wired in series with the feed control relay PR and perform the same function as the sensing members 38 and 39 (Fig. 6), in contact with the staple 47 of the sensing controls described hereinbefore. In this present form of sensing controls set forth in Figs. 8, 9 and 10, energization of the solenoid S is maintained until the edge of the feed control perforation 47' carries the finger 118 far enough to the left so that bail 116 is rocked clockwise sufficiently to open contacts 120. Although contacts 120 are normally closed, they are ineffective while contacts 291 and 55 (Fig. 6) are opened. It is only at the end of a long feed, when contacts 291 close, that closed contacts 120 complete a circuit through relay PR and hold it until pulled open by the edge of perforation 47'.

The finger 118 is urged around the pivot 117 in the counterclockwise direction, Fig. 10, by means of a leaf spring 122, secured thereto and contacting under a pin 123 extended from the side of the frame 111. Bail 116 is also provided with a spring 124, which tends to rock it in a counterclockwise direction about fulcrum 115 so that it is normally brought into contact with a stop lug 125 extending from frame 111. Spring 124 is coiled about stud 115 and caught under the cross bar of bail 116 at one end, and at the other end it rests on an extension 126 formed on the under side of frame 111. The other side of the frame 111 is formed with a platform 101 for supporting the contact blades, and an arm 127 through which passes supporting screw 112.

The feeler finger 118 is provided with restoring means for disengaging it from the record sheet after the sheet has been shifted into the first print position by the required number of auxiliary spacing operations performed subsequent to the carriage feeding operation. When the contacts 120 are opened, finger 118 is still caught on the edge of perforation 47, and it is desired that the initial line spacing movements of sheet 46' serve to release the finger. For this purpose the frame 111 is formed with a triangular opening 128 through which there extends a pin 129 on the side of the feeler finger 118. This pin normally contacts the rear vertical wall of the opening 128, but when the finger is drawn towards the left, Fig. 10, by the cooperation between the record sheet 46' and the pointed end of the finger, the pin 129 is gradually raised by contact with the lower sloping edge of opening 128. After the finger has been lifted above the upper surface of the record sheet, spring 124 takes effect to rock the bail 116 in a counterclockwise direction to return the parts to the normal position, wherein the finger 118 rests on top of the record sheet 46' in readiness to drop into the next perforation 47' which is not engaged until after the next long feeding operation.

Figs. 11 and 12 show an alternative form of staple sensing device, wherein a pair of brushes are mounted in an insulation block suspended in the path of the record sheet by means of a square bar 93' which may be located adjustably in the same fashion as the device shown in Fig. 9. A pair of brushes 38' and 39' (Fig. 11) are mounted in an insulation block 131 fastened between a pair of metallic side plates 132 and 133 pivoted on a rod 134 extending through the block 131. This pivot rod 134 also extends through a pair of downwardly extending side pieces 135 formed on a holder 136 that passes over the upper part of the bar 93'. A thumb screw 137

is threaded into the side of support 136 so that when the support is brought to desired position, the screw may be tightened to fix the sensing brush holder on the bar.

5 The one side block 131 is cut away with a recess 138 into which there is fitted a coil spring 139 which encircles the rod 134 and presses between the shoulder of the recess and the under side of the support 136. Thus, the block 131
10 tends to rock in a counterclockwise direction, Fig. 12, about pivot 134 and to press the brushes 38' and 39' down into contact with the record sheet 46 so that when a staple 47 is located under them, an electrical connection is made between
15 the two brushes. When substituted for members 38 and 39 in the wiring of Fig. 6, these brushes 38' and 39' serve to initiate energization of the solenoid S in the same fashion as when controlled by the sensing members, the control
20 of which is described hereinbefore with reference to Figs. 1, 2 and 6.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to several modifications,
25 it will be understood that various omissions and substitutions and changes in the form and details of the devices illustrated, and in their operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited
30 only as indicated by the scope of the following claims.

What is claimed is:

1. In a machine for feeding a record sheet divided into forms with feed control indicia, ordinary sheet feeding means, auxiliary feeding means controlled by electrical impulses for correcting the position of each form after operation of said ordinary feeding means, electrical
35 devices for operating said auxiliary means, means for sensing an indicium, an electric circuit controlled by said indicium acting in cooperation with said sensing means for making said devices effective, means for successively opening and
40 closing said circuit after it is energized and thereby sending a number of impulses which control said devices for operating said auxiliary feeding means, the number of said impulses sent depending upon the position of said indicium away from
45 the correct position after being fed by the ordinary means.

2. In a machine for feeding a continuous sheet divided into forms with a heading space and a feed control indicium on each form, means for feeding said sheet from form to form over the heading space, means for sensing the position
55 of a control indicium after each form feed, means for setting said sensing means at various positions along the path of the indicia to predetermine the size of heading desired, and auxiliary feeding means under control of said sensing means for moving said sheet to the correct position under the heading.

3. In a machine for feeding a record sheet divided into forms with feed control indicia, sheet feeding devices, auxiliary feeding means controlled electrically for correcting the position of a form after operation of said feeding devices, means for sensing an indicium, a relay held energized under control of said sensing means,
65 means for initiating energization of said relay, and a solenoid called into operation by said relay to cause operation of said auxiliary feeding means to correct the position of a form.

75 4. In a machine for feeding a record sheet di-

vided into forms with feed control indicia, sheet feeding devices, auxiliary feeding means controlled electrically for correcting the position of a form after operation of said feeding devices, means for sensing an indicium, a relay, means
5 for energizing said relay after operation of said sheet feeding devices, a holding circuit for said relay, said circuit being held by said sensing means as long as the sensed indicium is out of correct position, a solenoid controlled by said
10 relay to operate said auxiliary feeding means, and means cooperating with said solenoid to cause successive operation thereof until the position of a form is corrected.

5. In a machine for feeding a record sheet divided into forms with feed control indicia, means for line spacing said sheet, long feeding means for shifting said sheet from form to form, means for sensing the position of an indicium after each long feeding operation, auxiliary feeding means
15 for moving said sheet to a correct position, a relay, contacts in series with said relay and closed by said long feeding means at the end of each long feeding operation, a second relay, means under control of said first mentioned relay
20 for energizing said second relay, a holding circuit for said second relay including said indicium sensing means, and electrical devices made effective by said second relay to cause operation of said auxiliary feeding means to move a form to
25 the correct position.

6. In a paper feeding device for feeding a continuous sheet divided into forms with a heading space and a metallic insert on each form, means for line spacing said sheet, long feeding means
35 for shifting said sheet from form to form over the heading space, a pair of sensing means which are bridged by a metallic insert after each long feeding operation, and auxiliary feeding means operated under control of said sensing means when bridged by said insert for moving said sheet
40 to carry the insert out of bridging position and bring the sheet into the correct initial position.

7. In a machine for feeding duplicate record sheets divided into forms and held together with staples, sheet feeding devices, auxiliary feeding means controlled electrically by impulses for correcting the position of each form after operation of said devices, electrical devices for operating said auxiliary means, electrical connections closed by the presence of a staple therebetween after sheet feeding operation, means for energizing said devices successively with a series of impulses, means associated with said connections for initiating and sustaining operation of said devices and auxiliary means with impulses, said impulses continuing to be sent until the staple moves away and opens said electrical connections as the sheet arrives in the correct position.

8. In a machine for feeding a continuous sheet divided into forms with a heading space and a feed control staple on each form, means for feeding said sheet from form to form over the heading space, sensing devices which are bridged by the presence of a control staple therebetween after each form feed, means for manually setting said sensing means at a variable position along the path of said staple according to the size of heading desired, and auxiliary feeding means under control of said sensing means for moving said sheet to the correct position under the heading after each form feeding operation.

9. In a machine for feeding carbon sheets and interspersed record sheets divided into forms and held together with staples at regular intervals,

sheet feeding devices, auxiliary feeding means controlled electrically for correcting the position of a form after operation of said feeding devices, means for contacting each staple and establishing an electrical feed control circuit, a relay energized by said circuit, and electrical controls called into operation by said relay to cause operation of said auxiliary means to correct the position of a form.

- 10 10. In a machine for feeding a record sheet divided into forms with a feed control perforation in each form, sheet feeding devices, auxiliary feeding means controlled by electrical impulses for correcting the position of each form after operation of said feeding devices, electrical devices for operating said auxiliary means, normally closed contacts in circuit with said devices, a finger for engaging a control perforation and thereby moved by the sheet during the correcting movement, contact operating instrumentalities controlled by said finger for opening said contacts, means associated with said devices for successively opening and closing said circuit and thereby initiating impulses sent through said devices for operating said auxiliary feeding means, said impulses being sent continuously after operation of the sheet feeding devices and until the sheet reaches the correct position wherein the finger is operated to such an extent by said sheet that said contacts are opened, and means for restoring said finger in readiness to engage the next control perforation.

11. In a machine for feeding a continuous sheet divided into forms with a heading space and a feed control perforation in each form, printing devices, means for feeding said sheet from form to form over the heading space, a feeler for cooperating with a control perforation after each form feed, auxiliary feeding means, means for calling said auxiliary feeding means into operation after each form feed, means under control of said feeler for stopping operation of said auxiliary feeding means when the sheet is moved to position a form with the correct initial position under the heading, opposite the printing devices, and means for adjustably setting said feeler according to the size of the heading space.

12. In a machine for feeding a record sheet divided into forms with feed control perforations, sheet feeding devices, auxiliary feeding means controlled electrically for correcting the position of a form after operation of said feeding devices, a relay, a circuit for initiating energization of said relay, means for closing said circuit under control of said feeding devices, a circuit for holding said relay energized, contacts in said holding circuit, a finger cooperating with a control perforation to be operated by the sheet when it is fed, contact operating instrumentalities connected to said finger and operated thereby for opening said contacts when the sheet is properly positioned, and electrical devices called into operation by said relay for operating said auxiliary feeding means until said contacts open as the sheet arrives in the correct position.

13. In a machine for feeding a record sheet with spaced metallic inserts, regular sheet feeding devices, auxiliary correction feed devices, a pair of separate sensing brushes, an insulation block in which said brushes are mounted, an adjustable frame on which said block is pivoted so that the brushes rest on said record in the path of said inserts, electrical devices including a feed control circuit which is closed when the

sheet and an insert are positioned by said regular devices to bridge said brushes, and means under control of said electrical devices for operating said auxiliary feed devices to shift said sheet until the contacted insert thereon is moved out of contact with said brushes and into a corrected position.

14. In a machine for feeding a record sheet with feed control indicia, a main feeding means, means for sensing the position of an indicium, auxiliary feeding means for correcting the position of said sheet, a solenoid the energization of which is controlled by said sensing means, said solenoid operating said auxiliary feeding means, a pair of contacts in series with said solenoid, and means for opening and closing said contacts successively to cause repeated operation of said solenoid until the sheet is moved into correct position.

15. In a machine for feeding a record sheet with a feed control perforation, printing devices, devices for feeding said sheet near the proper position opposite said printing devices, auxiliary feeding means for correcting the position of said sheet, electrical connections which when closed cause operation of said auxiliary means, means for closing said connections under control of said feeding devices, means for opening said connections, a sensing member for operating said opening means, said member being moved by the edge of said control perforation to operate the opening means and stop the corrective feed of said auxiliary means when the sheet reaches the proper printing position.

16. In a machine for printing on a plurality of interspaced carbons and continuous record sheets divided into forms, each form having a heading and an area for receiving item printing impressions, said sheets being held together with staples on each form, a platen around which the sheets are fed, printing devices, line spacing devices, staple sensing members, long feeding devices for feeding said sheets after an item is printed on the last line of a form and skipping the heading of the next form and bringing the top of the item area opposite said printing means, said long feed placing a staple under said sensing members, a relay energized under control of said long feed devices at the end of the long feed operation, contacts controlled thereby, an auxiliary ratchet and pawl mechanism associated with said platen, a solenoid with a plunger connected to said pawl, a second relay in series with said staple sensing members and said contacts closed by said first mentioned relay, a second set of contacts in series with said solenoid and operated by said second relay to make the solenoid effective as long as the sensing members contact with the staple, a third set of contacts also in series with said solenoid, a vibrating lever operated by the solenoid to open said third contacts whenever the solenoid is energized, and a spring attached to said lever to restore it and close said third contacts when the solenoid is deenergized, the successive operations of said solenoid and the connected pawl serving to rotate the platen and feed the sheets until the staple is moved out of contact with said sensing members as the sheets are brought to the exact position for receiving the first item print impressions.

17. In a machine for feeding connected record forms with a metallic insert on each form, the insert of a first form controlling the positioning of a second form, a platen around which the forms are fed, printing devices, record feeding

means for operating the platen, auxiliary feeding means for operating the platen to correct the print starting position of each form, a paper table over which the record forms are moved, an insulation strip on said table in the path of the inserts, insert sensing members which are bridged by an insert of a form to close a circuit through the insert when all forms are out of correct starting position, means for adjustably securing said members in the path of the inserts, and

electrical devices connected to said sensing members and energized by the circuit therethrough for controlling the operation of said auxiliary feed means to feed said second form to the correct starting position under control of the insert of said first form which moves away from said members to break the operating circuit as the second form arrives in the correct starting position.

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