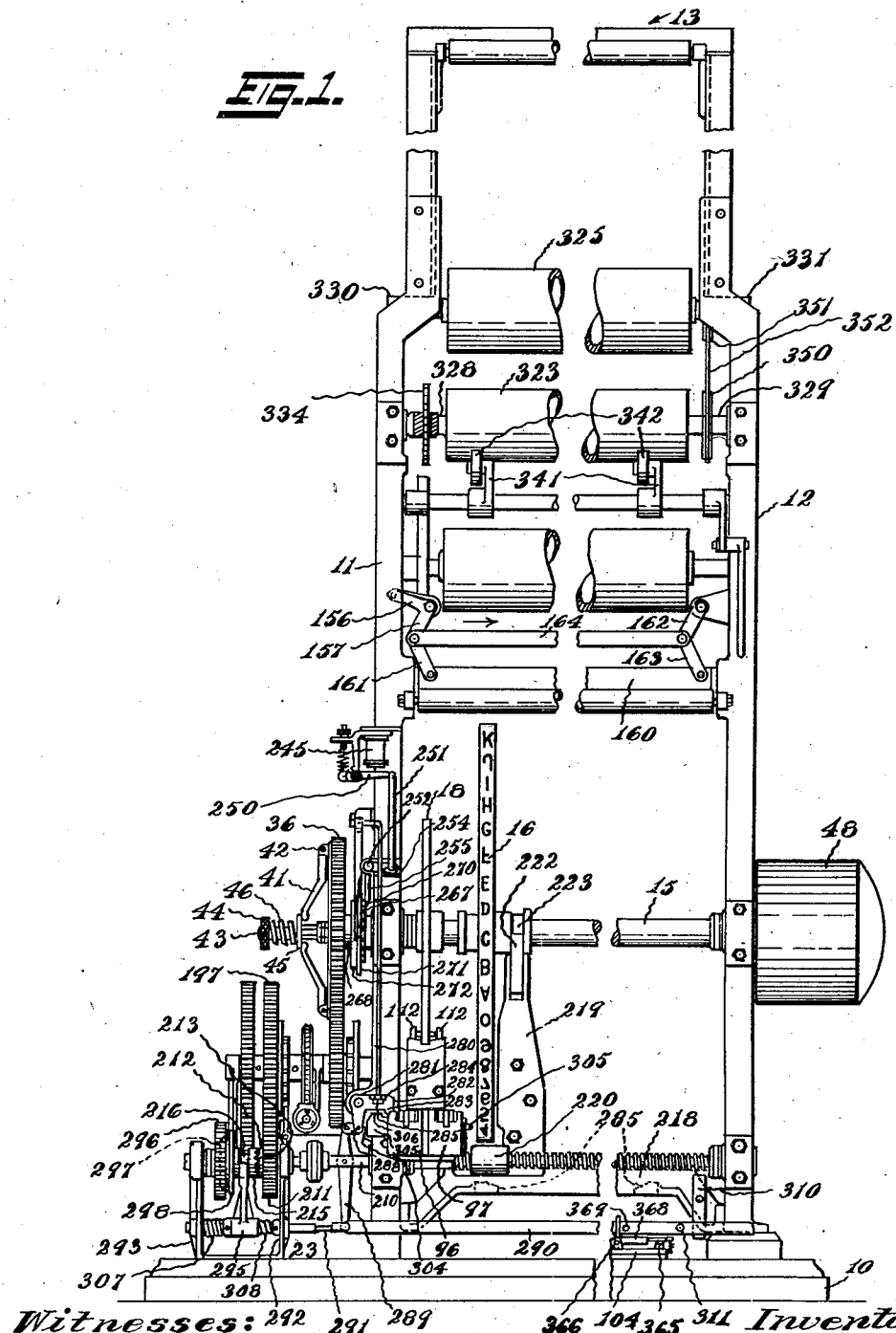
Oct. 13, 1931. T. W. MacKENZIE 1,826,805

BULLETIN PRINTING MACHINE

Original Filed June 20, 1922 6 Sheets-Sheet 1

Fig. 1.




Witnesses:
H. M. Kilpatrick
C. E. Whiteman

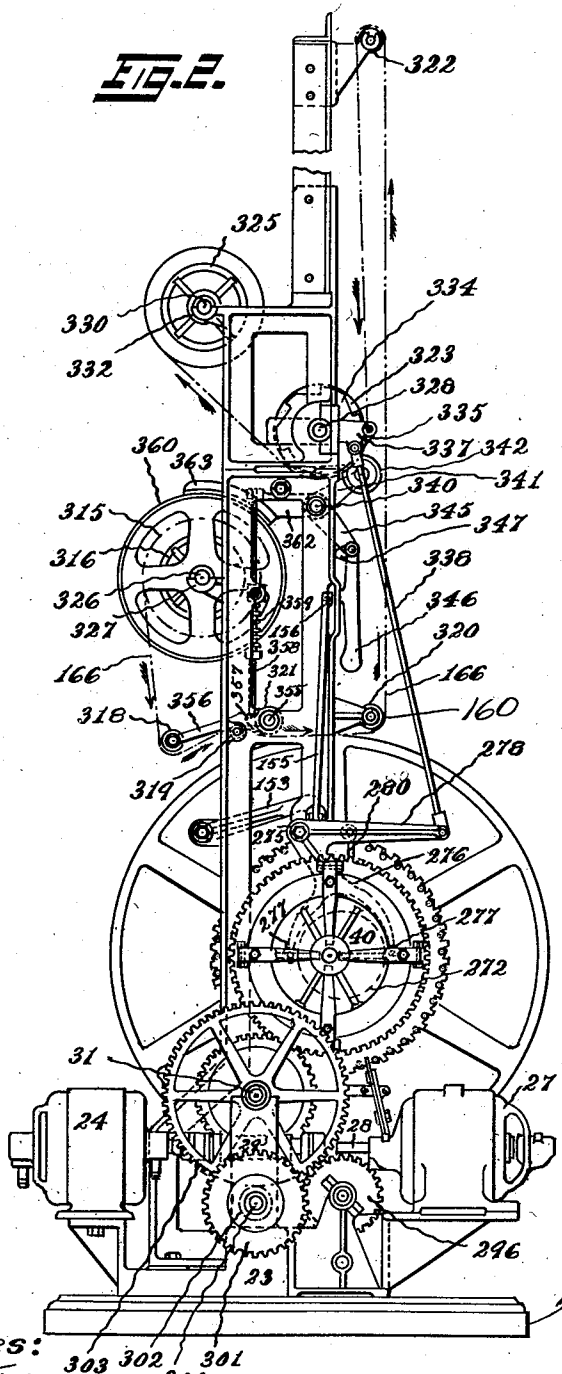
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BULLETIN PRINTING MACHINE

Original Filed June 20, 1922 6 Sheets-Sheet 2

FIG. 2.




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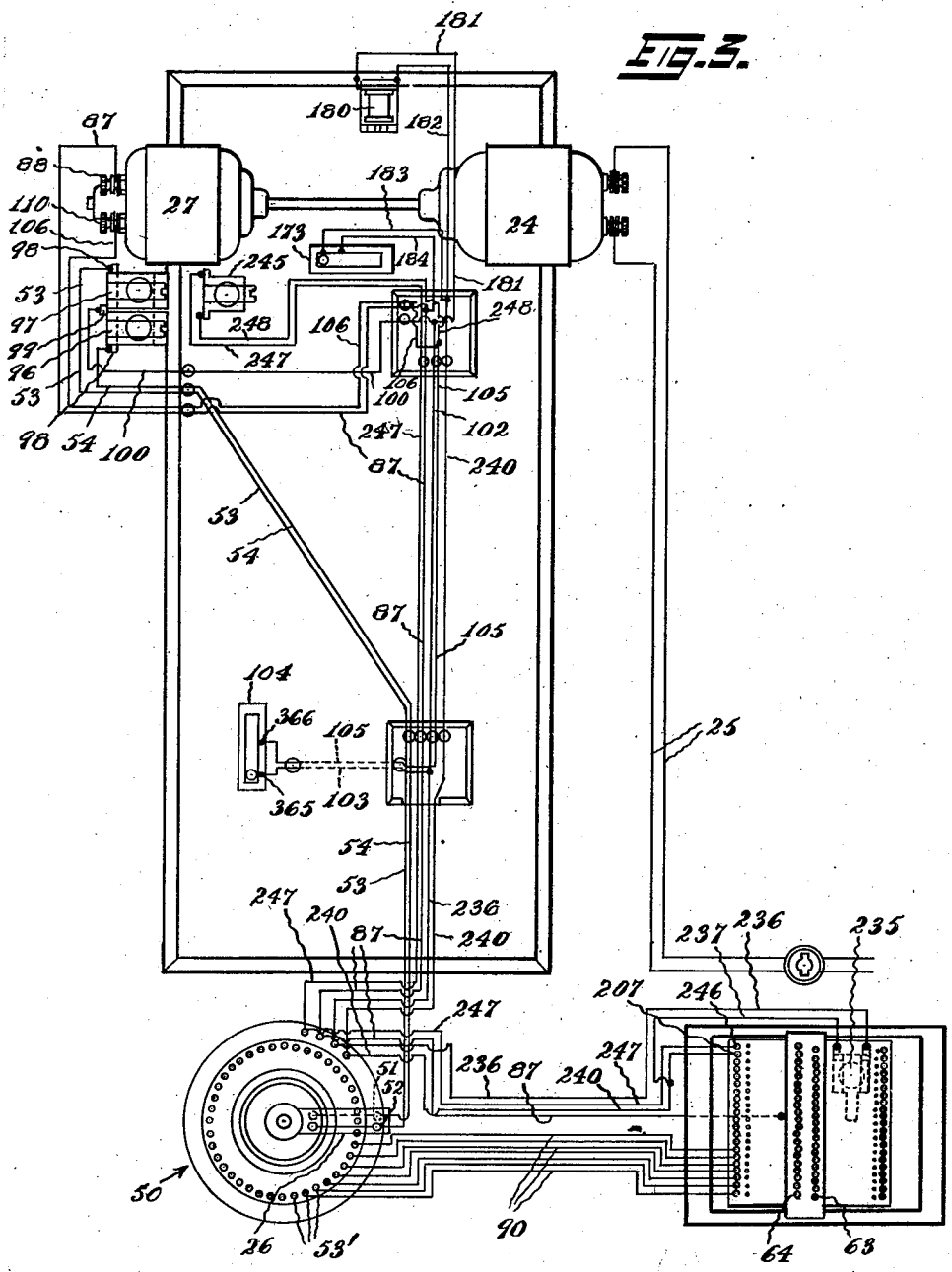
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BULLETIN PRINTING MACHINE

Original Filed June 20, 1922 6 Sheets-Sheet 3

Fig. 3.




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BULLETIN PRINTING MACHINE

Original Filed June 20, 1922 6 Sheets-Sheet 4

Fig. 4.

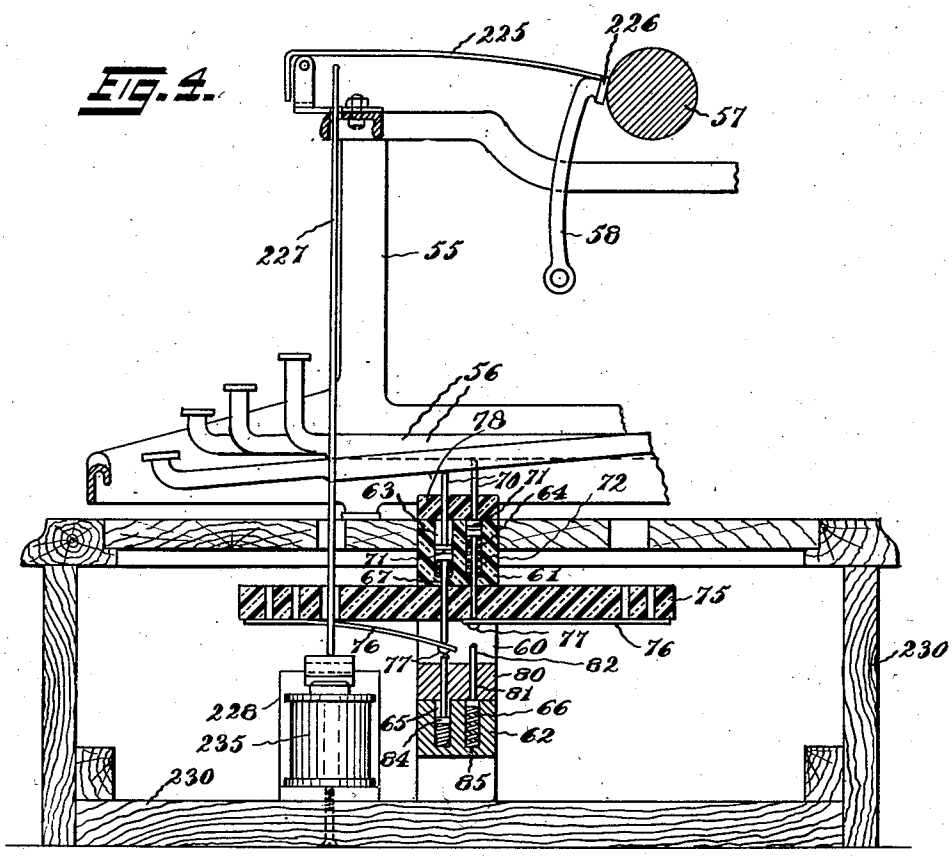
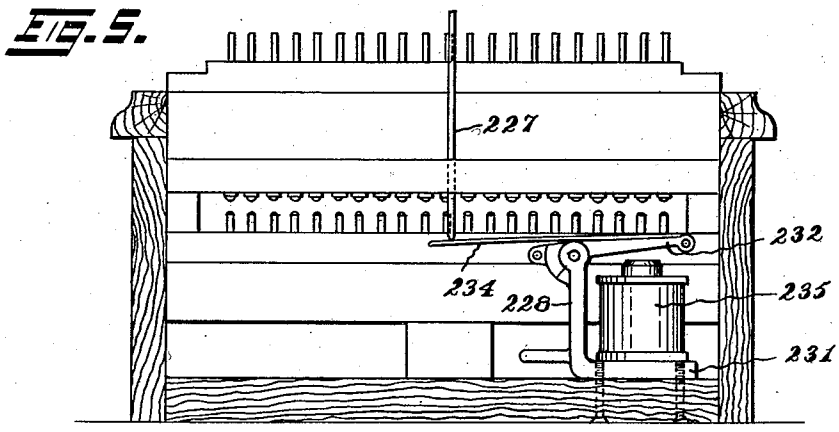



Fig. 5.




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BULLETIN PRINTING MACHINE

Original Filed June 20, 1922 6 Sheets-Sheet 5

Fig. 6.

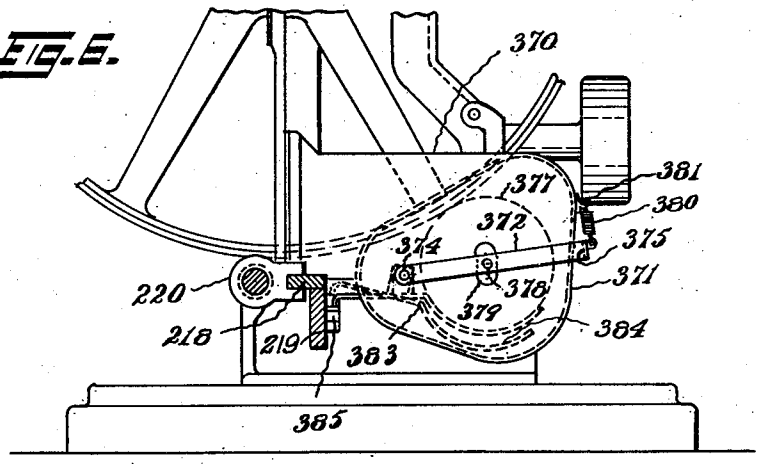
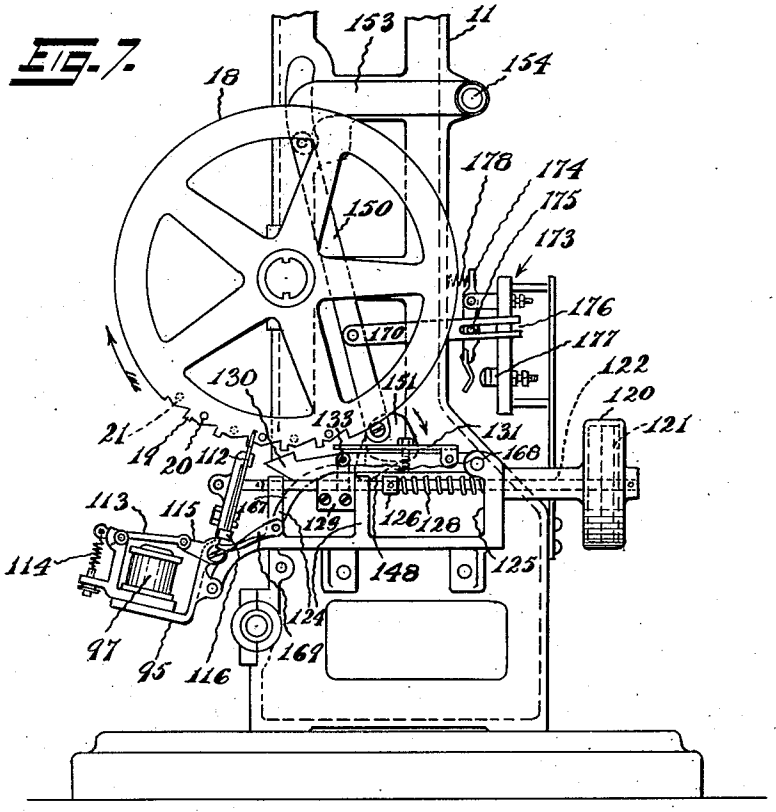



Fig. 7.




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Oct. 13, 1931. T. W. MacKENZIE 1,826,805

BULLETIN PRINTING MACHINE

Original Filed June 20, 1922 6 Sheets-Sheet 6

Fig. 8.

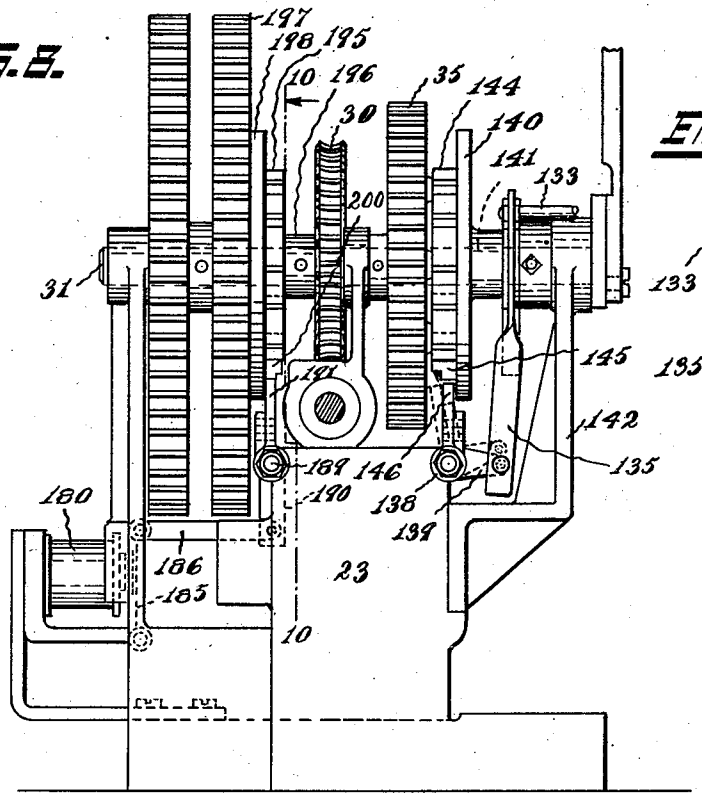



Fig. 9.

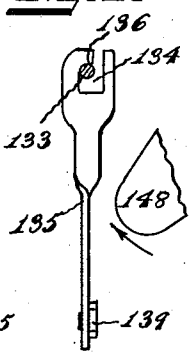
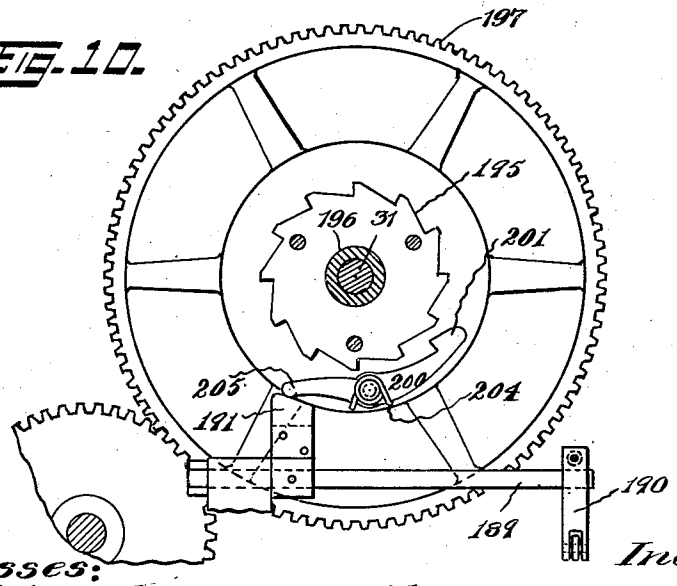



Fig. 10.




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Patented Oct. 13, 1931 1,826,805

# UNITED STATES PATENT OFFICE

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## BULLETIN PRINTING MACHINE

Refiled for abandoned application Serial No. 569,702, filed June 20, 1922. This application filed February 7, 1929. Serial No. 338,307.

This invention relates to telegraph bulletin printing machines, and especially to those suitable for printing newspaper bulletins and the like in page form on a continuous sheet of paper and in which the type may be quite large so as to be easily read from a distance.

This specification and the invention herein are substantially the same as that of my former application Serial No. 569,702, filed June 20, 1922.

The invention relates particularly to improvements in the telegraph bulletin printer described in the U. S. Patent No. 950,473, of Campbell and Davis, issued March 1, 1910, to which reference is made for a general understanding of machines of this kind.

One object of the invention is to provide an apparatus of this kind having detent means for holding the typewriter keys depressed until the spacing mechanism is operated thereby to prevent the depression of another key before the spacing mechanism has acted.

Another object of the invention is to provide an apparatus or device of this kind in which the typewriter keyboard comprising key levers has individual switches operated by said levers respectively whereby a source of electric current is connected to the type selecting mechanism.

Other objects of the invention are to improve generally the simplicity and efficiency of such machines and to provide an apparatus of this kind which is durable in operation, economical to manufacture and operate and which will not easily get out of order.

For the accomplishment of these and other objects my improved bulletin printing machine comprises, briefly stated, a yieldably rotated type shaft carrying a type wheel slidably splined on said shaft to rotate therewith, and an index wheel and a revolving switch arm fast on said shaft. The switch arm is provided with contacts engageable with a selecting switch having an annular series of contacts each corresponding to a character on the type wheel, and engageable by the switch arm when such corresponding character is in printing position. The controlling typewriter may be remote from the machine and comprises key levers operating individual contact switches respectively, whereby a source of electric current is connected to the corresponding contact of said series. A selecting mechanism or device electrically connected to said arm is adapted, as said shaft rotates and the revolving arm comes into contact with the energized contact corresponding to the depressed key, to be operated to engage and stop the index wheel to stop the type in position relative to the platen of the printing mechanism whereby to print the corresponding character by pressure of the paper on the type by a platen operated by platen operating means comprising a one-revolution printing clutch set in operation by and on the actuation of said selecting device, thereby to print the character. A spacing means or mechanism is provided comprising a one-revolution spacing clutch whereby said type wheel is spaced automatically each time the character is printed, or manually from the key-board. There is provided a special key release mechanism or detent means for holding said keys depressed until said spacing means is electrically operated, thereby to prevent the depression of another key before the spacing operation is complete, said detent means being released by the current that operates said spacing means; and there is also provided a mechanism comprising a one-revolution clutch for returning the type wheel to initial position and feeding the paper and spacing the lines.

Other objects of the invention will appear as the description proceeds; and while herein details of the invention are described, the invention is not limited to these, since many and various changes may be made without departing from the spirit of the invention or exceeding the scope of the appended claims.

In the accompanying drawings, showing by way of example one of many possible embodiments of the invention,

Fig. 1 is a front elevation of the bulletin printing machine, some of the details being removed;

Fig. 2 is a side elevation of the same;

Fig. 3 is a diagram of the electric connections;

Fig. 4 is a fragmental longitudinal vertical sectional view, partly in elevation of the typewriting machine controlling the printing machine;

Fig. 5 is a transverse vertical sectional view, partly in elevation of the typewriter switch;

Fig. 6 is a fragmental side elevation of the type wheel inking mechanism;

Fig. 7 is a fragmental side elevation of the selecting mechanism;

Fig. 8 is a fragmental front elevation of the one-revolution printing clutch;

Fig. 9 is a fragmental side elevation of the printing clutch operation initiating link; and

Fig. 10 is a transverse vertical sectional view, partly in elevation of the spacing clutch.

*The frame*

The various mechanisms of the machine are carried on a base 10 and a frame comprising a pair of upright frame side members 11 and 12 and a top connecting member 13.

*The type wheel and shaft*

The yieldably rotated type shaft 15 is mounted in said frame near the lower part thereof and projects from said frame at both ends and carries the rotatable type wheel 16 splined thereon or otherwise constrained to rotate with the shaft. An index wheel 18 fast on said shaft near the frame members 11 is provided with double shouldered peripheral teeth 19 (Fig. 7) and laterally projecting pins 20 and 21 on opposite sides of the wheel near said teeth and arranged in staggered relation for a purpose to be explained.

*The drive mechanism*

A motor bracket 23 (Fig. 2) disposed on said base 10 near said frame piece 11 at the index end of the machine carries a direct connected motor-generator set mounted on said bracket and comprising a motor 24 suitable for the commercial current from the line 25 (Fig. 3) which is to operate the machine, a generator 27 for generating current suitable for the operating parts of the machine, and a motor-generator connecting shaft 28 connecting said motor and generator and disposed transverse to the plane of the machine and carrying a worm 29 engaging a worm wheel 30 (Fig. 8) carried on a counter shaft 31 disposed above said worm and approximately in the plane of the machine.

A type-shaft rotating gear 35 mounted on said counter shaft engages a loose gear 36 loosely mounted on said type shaft at the projecting ends opposite from said switch. A ribbed friction disk 40 (Fig. 2) fast on said type-shaft and engaging the outer face of said loose gear is constrained to rotate with said shaft and is adjustably pressed against said gear by a pair of lever arms 41 (Fig. 1) pivotally mounted as at 42 near the periphery of the outer face of said loose gear and intermediately engaging said friction disk and having their inner free ends disposed near an extension 43 of said shaft 15. An adjusting nut 44 on said extension and a collar 45, between said nut and said inner ends and engaging said inner ends, engage a spring 46 compressed therebetween to cause said friction disk to engage said loose gear, whereby as said loose gear is positively rotated by the motor, the type shaft will be yieldably rotated thereby.

*The selecting commutator switch*

A switch housing 48 (Fig. 1) encloses a switch 50 (Fig. 3) comprising a revolving switch arm 26 fast on said shaft at one of its projecting ends and provided with a pair of end contacts 51 and 52 and collecting rings (not shown) connected to said contacts 51 and 52 and conductors 53 and 54, as will be explained. The stationary part of the switch 50 is mounted on one frame piece 12 and comprises an insulating support and a series of contacts 53′ each corresponding to a character on the type wheel. These contacts may be arranged in staggered relation on opposite faces of the support so as to be alternately engageable by one of the contacts 51 and 52 of the switch arm when the corresponding character of the type wheel is in printing position. The selecting switch is shown more in detail in said patent.

*The typewriter contact switches*

A usual typewriting machine 55 (Fig. 4), which may be remote from the printing machine, comprises a keyboard having a series of key levers 56 corresponding to the contacts 53′ on said switch and the corresponding letters of the type wheel 16, a typewriter platen 57, and type bars 58 connected to said levers and adapted to strike paper carried on said typewriters platen. A frame 60 carried below said key levers transversely to the plane of movement thereof comprising an upper insulating frame member 61 and a lower conducting frame member 62 respectively provided with a pair of series of upwardly opening plunger bores, 63, 64, 65 and 66, the bores of the upper frame member being provided with reduced axial extensions 67 passing down through said upper frame member. The bores of one series are arranged in staggered relation with the bores of the adjacent series (Fig. 3) to insure proper relation with the key levers. Vertically movable plunger rods 70 disposed in said upper bores and extensions engage the lower face of corresponding key levers 56 and are provided intermediately with spring receiving plungers 71 fast on the rods and movable up and down in the bores and engaged by springs 72 compressed

between said plungers and the lower end of the bores. An insulating board 75 secured to the bottom face of said upper frame member 61 and provided with perforations receiving said rods 70 carries flat contact springs 76 having their outer ends anchored near the outer part of the under face of said board and having their inner free ends engaging said rods 71 and provided on the lower face with contact buttons 77. An insulated cover plate 78 mounted on the upper face of said upper frame member and provided with perforations receiving said rod holds the plungers and rods 71 in place.

A similar cover plate 80 is mounted on the lower frame member 62 and provided with small vertical bores 81 co-axial with said lower bores and receiving contact rods 82 disposed normally out of contact with said buttons 77 and engageable by the buttons when the said flat springs are depressed. The rods 82 are provided at their lower ends with terminal plungers 84 engaged by springs 85 disposed in said lower bores to yieldably hold said contact rods raised and to permit the latter to be depressed as the key levers are depressed, thus to make a good contact with the buttons. A common conducting line 87 (Fig. 3) connects one pole 88 of the generator to said lower conducting frame whereby all of said conducting contact rods are connected to said pole. Conductors 90 connect said flat springs 76 to the corresponding contacts 53 on said commutator switch whereby when one of said key levers is depressed, electrical connection is made between said common line 87 and the corresponding commuta or contact which said revolving arm will reach when the character on the type wheel corresponding to the depressed key lever reaches printing position, whereupon the connection is made with the conductor 53 or 54 depending upon which moving contact 51 or 52 engages the energized contact 53′. The conductors 53 and 54 lead to the selecting mechanism, now to be described for stopping the type wheel in printing position.

*The selecting mechanism*

A selector magnet bracket 95 (Fig. 7) pivoted beneath said index wheel 18 carries a pair of selector magnets 96 and 97 (Figs. 1 and 3) each having one terminal 98 (Fig. 3) electrically connected as by the conductors 53 or 54 to the respective collector rings of said switch arm. The other terminal 99 is electrically connected through the conductors 100, 102, 103, the cut-out switch 104 (later to be described) conductor 105, and conducting line 106 to the other pole 110 of the generator. A pair of inwardly spring pressed stop latches 112 (Figs. 1 and 7) are pivotally connected to said bracket 95, each normally out of contact with said pins 20 and 21 and adapted when released to engage one of said pins to stop the index wheel and the type shaft, as will be explained, whereby said loose gear 36 revolves in frictional engagement with said disk 40 and leaves the selected type in printing position. Individual armatures 113 for the respective selector magnets are pivotally mounted on said brackets 95 and yieldably held away from said magnets as by the tension spring 114. Elbow detents 115 pivoted on said bracket and having one end pivotally connected to the free end of the respective armatures 113 and the other end engageable under the respective inwardly turned tails 116 formed on the fulcrum and of the latches, hold the latches out of engagement with said pins until one of the magnets is energized as explained, and draws the detent 115 from under a tail and permits the latch to engage one of the pins 21 or 21. A dash pot 120 is provided with a plunger 121 and a plunger rod 122. Said rod is pivotally connected to said latch bracket 95 and slidable in guide brackets 124 and 125 and carries a collar 126 between which and said bracket 125 is compressed a spring 128 whereby said latches are yieldably held toward the direction from which the lower part of said index wheel moves (as shown by the arrow of Fig. 7) and is yieldably permitted to move a short distance in its direction of movement after one of said latches has been released, by the movement of one of said armatures 96 or 97 induced by the energizing of the magnet brought about by the current received from one of the commutator contacts corresponding to a depressed key. A cam collar 129 secured on said plunger rod engages a locking pawl 130 pivotally connected to said bracket 125 to raise the pawl into locking engagement with one face of one of said teeth 19, on the movement of the plunger as explained, thereby to stop the index wheel in position to print the character corresponding to the depressed key lever. A recoil preventing detent 131 carried on said locking pawl and adapted to rise into engagement with the rear face of the tooth just to the rear of the tooth engaged by the pawl, thereby prevents recoil movement of the index wheel, the type shaft and the parts carried thereby. The selecting mechanism is shown somewhat more in detail in said patent.

*The printing clutch operating mechanism*

A laterally projecting clutch operation initiating pin 133 is carried fast on said locking pawl and engages in vertical slot 134 (Fig. 9) at the upper end of a vertical releasing link 135 and provided with an under cut shoulder 136 adapted to engage over said pin 133 thereby to raise the link when the locking pawl 130 is raised, and to be released from said pin when said shoulder is pushed off from the pin, as will be explained. An elbow lever 138 (Fig. 8) fulcrumed at its elbow

part on said bracket 23 has the free end of its motive arm 139 pivotally connected to the lower end of said link.

*The printing clutch*

A pawl carrying disk 140 is carried fast on a printing shaft 141 co-axial with said counter shaft 31 and supported on a bearing bracket 142. A ratchet wheel 144 fast on said shaft rotating gear 35 is engageable by a clutch pawl 145 (similar to the pawl 200 of Fig. 10) pivotally connected on said disk and adapted to be yieldably spring pressed into engagement with the teeth of said ratchet and provided with a tail normally engaged by the upwardly pointing active arm 136 of said elbow lever 138 thereby to hold said pawl out of engagement with said ratchet wheel.

*Operation of the printing clutch*

When said tail is engaged by the upwardly pointing active arm of said elbow lever, the lever holds said pawl out of engagement with said ratchet wheel, whereby the printing shaft is allowed to remain stationary as when said locking pawl 130 (Fig. 7) is in lowered position. But when said locking pawl 130 is raised to locking position, as heretofore explained, said link 135 is raised and said active arm 146 is caused to move from under and release said tail to permit said pawl 145 to engage the ratchet wheel 144 and cause said disk and printing shaft to be rotated by said ratchet wheel through the distance of one revolution. A link releasing cam 148 (Figs. 7 and 9) carried on said printing shaft engages said link 135 and pushes said shoulder 136 from said printing pin 133 as said printing shaft performs a complete revolution, whereby said active arm will again engage said tail and release said yieldably pressed pawl 146 from said ratchet wheel, thereby to permit the printing shaft to stop at the end of one revolution.

*The printing mechanism*

An upwardly disposed printing link 150 (Fig. 7) is eccentrically pivoted to a latch releasing cam 151 mounted on the end of said printing shaft near said locking pawl and has its upper end pivotally connected to the free end of a link arm 153 mounted on a rocking shaft 154 mounted on the adjacent side frame member 11. An upwardly disposed printing bar 155 (Fig. 2) pivotally connected at its lower end to the moving end of said link arm 153 has its upper end pivotally connected to the free end of the motive arm 156 (Fig. 1) of a toggle elbow-lever 157 fulcrumed at its elbow part on said frame for movement in the plane of said frame. A vertically movable platen bar 160 disposed across said frame and having its ends vertically guided in said side members 11 and 12 just above said type wheel has one end pivotally connected to a toggle link 161 connected to the free end of the motive arm of said toggle lever 157. A set of toggle links 162 and 163 pivotally connects the opposite end of said platen bar to the other side frame member and has its respective members parallel to said active arm and said first mentioned toggle link; and a synchronizing bar 164 connects the mid pivots of said toggles thereby to cause the toggles to move in unison and constrain the platen bar to remain horizontal during its movement.

*Operation of the printing mechanism*

Each rotation of the printing shaft, as previously explained, brings about reciprocatory movement of the upwardly disposed link 150 and the bar 155 causing said toggle mechanism to operate each time the printing shaft passes through a complete operation, thereby pressing downwardly the platen 160 and the paper 166 (Fig. 2) against the type wheel, the type wheel and index wheel being held locked by said locking pawl 130 and said recoil preventing detent 131. An armature releasing lever 167 (Fig. 7) intermediately fulcrumed on said bracket 124 is provided with a motive arm 168 engageable and depressable by said releasing cam 151 after the printing operation has taken place, and is provided with an active arm 169 engageable under said tails 116 thereby to release said latches 112 from the index pin 20 or 21 and to permit said tail to permit said elbow detents 115 to be drawn, under the action of said spring 114, into latching position under the tails, thereby to release the index and type wheels for movement to another printing position.

*The spacing clutch operating mechanism*

A laterally projecting spacing initiating bar 170 (Figs. 3 and 7) is pivotally connected at its inner end to the lower part of said upwardly disposed link 150, whereby as the lower end of said link is eccentrically moved said initiating bar will have a reciprocating motion, said bar being bifurcated at its outer end to form a slot. A yieldably opened spacing switch 173 is provided with a pivoted contact lever 174 having a pin 175 engageable in a slot 176 in the bar 170. Said switch is provided with a contact member 177 whereby said switch is closed by said initiating bar after the printing operation has taken place and against the action of the compression spring 178. The closing of said switch energizes a spacing magnet 180 (Figs. 3 and 8) mounted on the outer face of said motor generator supporting bracket and electrically connected across the generator poles 110 and 88 (Fig. 3) by conductors 106 and 105, cut-out switch 104, conductors 103, 102 and 181, the spacing magnet 180, conductors 182 and 183, the spacing switch 173 and conductors

184 and 87, whereby when said switches are closed said magnet 180 is energized.

A vertically disposed armature 185 (Fig. 8) pivoted at its lower end and disposed in front of said spacing magnet has its upper end pivotally connected to a horizontal spacing connecting link 186. A pawl detent rocking shaft 189 (Fig. 10) mounted on said bracket 23 near and parallel to said worm shaft carries at one end a downwardly projecting arm 190 pivotally connected to said spacing link 186. Said rocking shaft also carries an upwardly pointed detent 191 presently to be mentioned.

*The spacing clutch*

A ratchet wheel 195 (Figs. 8 and 10) secured to a collar 196 fast on said counter shaft 31 is spaced a slight distance from a spacing gear 197, loosely mounted on said counter shaft and provided with a pawl carrying disk 198 fast thereon adjacent to said ratchet wheel. The clutch pawl 200 intermediately pivotally connected to said disk is provided with a hooked end 201 adapted for yieldable engagement with the teeth of said ratchet under the action of the spring 204 and is provided with an outwardly disposed tail 205 adapted normally to be engaged by said detent 191 whereby the pawl is normally held out of engagement with said teeth, whereby the ratchet wheel and counter shaft may be revolved without revolving the spacing gear 197.

*Operation of the spacing clutch operating mechanism and the spacing clutch*

The energizing of said spacing magnet 180 brought about by the closing of said spacing switch 173 causes said detent to be removed from engagement with said tail 205 to permit the pawl to be spring pressed into engagement with said ratchet 195, thereby to cause the rotation of the spacing gear. The closing of said spacing switch is of such short duration that the magnet 180 may be de-energized and the detent 191 returned to normal position before the complete rotation of the spacing gear 197, whereby said tail is again engaged by said detent and the pawl released from the ratchet wheel, thereby to permit the spacing gear to cause rotating, after having rotated through one revolution.

The magnet 180 may also be energized by depressing a spacing key lever, closing the spacing contact 207, (Fig. 3) whereupon current passes through pole 110, conductors 106, 105, cut-out switch 104, and conductors 103, 102, 181, spacing magnet 180, and conductor 182, as above explained, and then through conductor 240, and switch 207, and the common line 87, thus energizing the spacing magnet 180 and operating the spacing mechanism as above explained.

*The spacing mechanism*

A horizontal spacing lead screw shaft 210 (Fig. 1) mounted in the lower part of the main frame has loosely mounted thereon a spacing clutch gear 211 engaging said spacing gear 197 and provided with an outwardly pointing hub 212 provided with clutch teeth 213. A slidable clutch member 215 is splined on said shaft 210 to constrain the shaft to rotate therewith and is provided with an intermediate annular groove 216 and clutch teeth normally engaging the teeth 213 of said hub 212. A guide bar 218 (Fig. 6) near and parallel to said lead screw shaft carries an upright spacing bracket 219 (Fig. 1) provided at its lower end with a lead nut 220 embracing the threads of the lead screw shaft. Said bracket 219 is provided at its upper end with a bifurcated yoke 222 engaging in an annular groove 223 of the type wheel hub. The pitch of said lead threads is such that as the spacing gear rotates said one revolution, the clutch-gear hub-teeth 213 will engage said clutch member and rotate said lead-screw shaft sufficiently to cause said spacing bracket 219 and type wheel to move along the type shaft and lead screw shaft, one letter space distance.

*The key release mechanism*

This mechanism comprises detent means for holding the depressed typewriter keys depressed until the selecting mechanism and spacing mechanism are electrically operated, thereby to give a signal against the depression of another key before the spacing takes place.

The detent means comprises a pivoted detent 225 (Fig. 4) mounted on the typewriter frame and adapted to engage behind the typewriter type 226 at the instant of impression, thereby to hold the typewriter key depressed to give the printing and spacing mechanism time to act, after which the detent 225 will be raised, as will be explaind, by a vertical releasing rod 227 engageable under said detent. The lower end of said rod is passed through a hole in said insulating board to near a release bracket 228 secured to the lower part of the typewriter support 230 and is provided with a flat base 231 (Fig. 5) and an upright bracket at one side of said base. An armature 232 pivoted to the upper end of said bracket is provided with a releasing lever 234 secured thereto and engaging under said rod, whereby when the armature is lowered said rod is raised. A releasing magnet 235 on said base and influencing said armature is provided with conductors 236 and 237 (Fig. 3) whereby said key releasing magnet is connected in parallel with said spacing magnet, but in series with the spacing switch, whereby, when the spacing magnet is operated after the printing operation has taken place, the releasing magnet 235 will be

energized thereby to depress its armature and raise said detent to release the typewriter key to permit the key for the next letter to be struck. Instead of the magnet 235 and the detent, the circle 235 of Fig. 3 may represent a simple electric lamp, in which case, the operator would merely wait for the lamp to light up before striking the next key.

*Operation of the key release mechanism*

When the key lever 56 is depressed, the detent 225 immediately engages and holds the type 226 raised and prevents another key from being completely depressed. The detent then remains in the position of Fig. 4 until the spacing switch 173 is closed, whereupon current passes through the terminal 110, the conducting line 106, the conductor 105, the cut-out switch, the conductors 103 and 236, the releasing magnet 235, conductors 237, 240 and 183, spacing switch 173, conductor 184, the common line 87 and the terminal 88, thus energizing the releasing magnet raising the detent 225 and releasing the type bar 58, so that another key lever may be operated for again selecting type on the type wheel.

*The paper feed and type wheel return clutch operating mechanism*

A line spacing or paper feed magnet 245 (Figs. 1 and 3) mounted on the frame member 11 is connected across between said common line 87 and said conducting line 106 in series with the key lever switch 246 through conductors 247 and 248. Said magnet is provided at its lower end with a yieldably downwardly moved feed armature 250 (Fig. 1) to the free end of which is pivoted a downwardly disposed link 251. A pawl detent rocking shaft 252 mounted on said frame 11 near the lower end of said link carries at one end a horizontal projecting arm 254 pivotally connected to said line spacing link. Said rocking shaft also carries a downwardly pointed detent 255, presently to be explained.

*The combined paper feed and type wheel return clutch*

A ratchet wheel 267 fast on a sleeve 268 fast on said loose gear 36 is engaged by a clutch pawl 270 (similar to the pawl 204 of Fig. 10) pivoted on a pawl carrying disk 271 loosely mounted on said sleeve adjacent to said ratchet wheel and carrying fast thereon a line spacing or paper feed eccentric disk 272. The clutch pawl 270 is like the pawl 204 of Fig. 10 and is intermediately pivotally fulcrumed on said disk 271 and provided with a hook end adapted for yieldable engagement with the teeth of said ratchet wheel 267 and provided with an outwardly disposed tail normally adapted to be engaged by said detent 255 whereby the pawl is held out of engagement with said teeth whereby the ratchet wheel and loose gear may be revolved without revolving said eccentric disk. A paper feed bell-crank lever 275 (Fig. 2) fulcrumed at its elbow part upon said side frame member 11 has its downwardly disposed motive arm 276 widely forked and provided at the extremities of the fork prongs with rollers 277 engaging said eccentric disk 272 at opposite sides, whereby when said disk is revolved through a rotation, the paper feed lever will be given one complete oscillation. The active arm 278 of the paper feed lever is approximately horizontally disposed, as shown in Fig. 2.

*Operation of the combined paper feed and type wheel return clutch*

The energizing of said line spacing or paper feed magnet 245 brought about by the operation of the line spacing paper feed lever switch 246 of the typewriter causes said detent 255 to be removed from engagement with said pawl 270 to permit the pawl to be spring pressed into engagement with the ratchet wheel and cause the rotation of said eccentric disk and the oscillation of the lever 275 in order to bring about operation of the line spacing or paper feed mechanism, and the type wheel return mechanism presently to be described.

The closing of said paper feed switch 246 is of short enough duration to permit the magnet to be deenergized and the detent to be returned to normal position before the complete rotation of the eccentric disk whereby said pawl is again engaged by said detent and the pawl released from the ratchet, thereby to permit the paper feed eccentric disk to remain at rest or to be revolved again in like manner to feed the paper another line space, on repeated or continued pressure on the paper feed key lever.

*The type wheel return mechanism and clutch*

A downwardly disposed carriage return link rod (Fig. 1) 280 pivotally connected to the intermediate part of said active arm 278 is pivotally connected to an elbow level 281 fulcrumed on said side frame 11. The motive arm 282 of the elbow lever is horizontally disposed and provided with a downturned end 283 and an outwardly turned perforated ear 284 loosely receiving said link rod and engage on its lower face by a nut 285 at the lower end of the link rod, whereby when said paper feed lever is oscillated said link rod is raised and the elbow lever oscillated. A short link 288 pivotally secured to the lower free end of the downwardly pointing active arm of said elbow lever 281 is pivoted at the other end to a clutch shift lever 289 intermediately pivoted on said bracket 23 and having its lower end pivoted to a clutch reversing bar 290 slidably disposed across the lower part of the main frame parallel and

near to said lead screw shaft 210 and having its left hand end pivotally connected to the right hand end of a clutch shift rod 291 slidably mounted in the lead screw shaft brackets 292 and 293 and in alinement with said shift bar 290. A clutch shift bracket 295 fast on said shift rod is provided at its upper end with a yoke engageable in said annular groove 216 of the the clutch member 215. A return clutch gear 296 loosely mounted on said lead screw shaft is provided with a cone-shaped recess 297 adapted to engage a friction disk 298 of the clutch member 215 when the latter is moved leftwardly. An in ermediate shaft 300 (Fig. 2) mounted on said bracket 23 parallel to said lead screw shaft carries a larger gear 301 fast thereon and engaging said return clutch gear 296; and also carries fast thereon a smaller gear or pinion 302 engaging a return drive gear 303 fast on said countershaft 31, whereby when said friction disk 298 engages in the recess, said type wheel bracket and said wheel are quickly returned to initial position.

A sliding detent 305 (Fig. 1) is provided with an upturned end 306 adapted to be yieldably moved rightwardly, under the influence of a spring 304, to a position under said downturned end 283 when the latter is raised, thereby to lock said elbow and clutch levers and friction disk in clutch returning position until said type wheel is returned to initial position, whereby said slidable detent 305 is engaged by said spacing bracket 219 and said raised end 306 removed from under the elbow-lever-detent thereby to permit said elbow lever 281 to resume normal position and the friction disk to disengage from the recess under the action of a helical spring 307 on the rod 291. The spring 308 serves to cushion this movement.

A safety lever 310 (Fig. 1) intermediately pivotally mounted on said guide bar 218 is adapted to be oscillated by the nut 220 when the type wheel approaches the end of the line, and to engage a pin 311 carried on said clutch shift bar, whereby said clutch bar is forced leftwardly to returning position, thereby to cause the friction disk 298 to engage in said recess 297 and the detent end of said active arm 284 to be raised thereby to permit said raised end 306 of the sliding detent 305 to move under the downturned end until the type wheel is returned to initial position, whereupon the detent is pushed from under the downturned end, as explained.

*Operation of the type wheel return clutch and mechanism*

Oscillatory movement of said elbow lever 281 brought about by the rotation of the eccentric disk causes said downturned end 283 to be raised and said active arm of the elbow lever to be moved rightwardly on Fig. 1 thereby to cause leftward movement of said clutch shift bar 290 and rod and clutch member 215 thereby to cause the teeth of the clutch member to disengage from the teeth 213 of said clutch gear and to cause said friction cone disk 298 to be moved leftwardly into frictional engagement with the recess 297. During this operation, as the downturned end 283 is raised the raised end 306 of the sliding detent is yieldably moved under said downturned end, thereby to lock said elbow and clutch levers, and friction disk 298 in clutch returning position, until said type wheel is returned to initial position, whereby said slidable detent is engaged by said type wheel bracket and said raised end removed from elbow-lever-detent position, thereby to permit said elbow lever to resume normal position and the friction disk to disengage from the recess under the action of the spring 307.

Should the type wheel be accidentally or otherwise carried to the end of the line, the safety lever 310 is oscillated when the type wheel approaches the end of the line, and the pin 311 is engaged by said safety lever whereby said clutch bar 290 is forced to returning position, thereby to cause the friction disk 298 to engage in the recess 297 and the downturned end 283 of said elbow lever to be raised, thereby to permit said sliding detent to engage under the downturned end until the type wheel is returned to initial position as above stated.

*The paper feed mechanism*

The paper 166 from the roll 315 of paper on the supply roll 316 passes beneath the tension roll 318 (Fig. 2) over the intermediate roll 319, beneath the lower guide rolls 320 and 321 and platen 160 above and over the upper guide roll 322 under the feed roll 323 and around the take-up roll 325. The supply roll 315 (Fig. 2) is horizontally disposed at the back of said frame a slight distance and higher than said platen and is provided with shaft ends 326 removably rotatably mounted in bearings 327 at the rear of said main frame. The upper guide roll 322 is mounted forward of the upper part of said main frame and thus a large exposure portion of the paper between the rollers 320 and 322 is provided. The feed roll 323 is rotatably disposed across said frame about midway between said upper and lower guide rolls and provided with stub shaft ends 328 and 329 (Fig. 1) rotatably mounted on the side frame members 11 and 12. The removable take-up roll 325 is provided with shaft ends 330 and 331 removably rotatably mounted in bearings 332 on the rear of the frame side members 11 and 12. A ratchet wheel 334 fast on one of the shaft ends 328 of the feed roll is yieldably engaged by a hooked pawl 335 carried on a pawl lever 337 ful-

crumed on said shaft end 328. A feed link 338 (Fig. 2) is pivotally connected to said pawl lever and to the free end of the active arm 278 of said feed lever 275, whereby when said feed lever 275 is oscillated said pawl 335 is moved back the distance of one tooth and engages said ratchet wheel 334 and moves the ratchet wheel and feed roll the distance of one tooth, thereby feeding the paper upwardly a distance of one inter-line space. A presser roll shaft 340 rotatably mounted between said side members 11 and 12 beneath said feed roll carries fast thereon a plurality of presser roll brackets 341 carrying at their outer upper ends presser rolls 342 adapted to engage the paper on the feed roll thereby to hold the paper in feeding frictional engagement with the feed roll. A motive arm 345 fast on said presser roll shaft adjacent to one of said side members carries a locking lever 346 pivotally mounted on the free end of said motive arm and provided at its fulcrumed end with a locking lug 347 adapted when the lever is lowered to engage substantially perpendicularly against the side member 11 thereby to force and lock the presser rolls 342 in firm engagement with the paper. The locking lever is raised when it is desired to thread the paper on to the feed roll. Take-up pulleys 350 (Fig. 1) fast on the shaft ends 329 and 331 carry a take-up roll at the side opposite from said ratchet wheel. A belt 352 yieldably connects said pulleys, whereby as said feed roll is rotated to feed paper to the take-up roll 325, said take-up roll is rotated to wind up the paper fed thereto. Said pulleys and belt are so proportioned that the take-up roll will take up all of the paper fed to it when the paper rolled is small and will permit the belt to slip a slight amount when the paper roll is large, thereby surely to wind all the paper fed to the take-up roll and at the same time prevent undue tension on the paper.

A horizontal tension-roll bracket-supporting shaft 355 (Fig. 2) carried on the rear of the main frame about on the level with the platen has fast thereon a pair of supporting arms 356 rotatably supporting said tension roll 318. A lug 357 fast on one end of said shaft engages a brake rod 358 resting on said lug and vertically guided in said frame and yieldably spring pressed downwardly against the lug by a spring 359. A brake drum 360 fast on one of the shaft ends 326 of said supply roll is engaged by a brake lever 362 pivoted on said presser roll shaft 340 and provided with a shoe 363 engaging said drum. The brake lever is connected to the upper end of said brake rod 358 whereby when the paper leaving the supply roll is tensioned enough to raise the tension roll 318, said brake shoe will be raised from the brake drum to permit the weight of said tension roll and the force of said brake rod spring to force the additional paper from the supply roll and permit the brake shoe to again engage the drum, whereby even tension is maintained on the paper.

*Operation of the paper feed mechanism*

Whenever it is desired to feed the paper one or more lines, the paper feed key lever is depressed closing the switch 246 (Fig. 3), energizing the magnet 245, rotating the disk 272 (Fig. 2), oscillating the active arm 278 and the pawl lever 337, and rotating the paper feed roll 323 one line space. This operation also sets in operation the type wheel return mechanism; and if the paper is to be fed one or more than one line space either after the paper wheel is returned or while it is being returned either as above stated or by the automatic actuation of the safety lever 310 (Fig. 1), the paper feed key lever is either depressed a sufficient number of times or length of time to permit the disk 272 to rotate one or more times as desired.

*Cut-out switch*

The cut-out switch 104 (Figs. 1 and 3) is provided for preventing the operation of the spacing and selecting mechanisms while the type wheel is being returned to initial position. As hereinbefore fully described, the cut-out switch is interposed in series with the operating circuits of the spacing magnet and the printing magnet. It is therefore evident that when the cut-out switch is open, these mechanisms cannot operate. The cut-out switch is therefore so arranged that when the type wheel is being returned, the cut-out switch will be open.

The cut-out switch carried on said base 10 comprises terminals 365 and 366 to which are secured said conductors 103 and 105.

These terminals are normally connected by the switch lever 368 adapted to be opened by a pin 369 carried on the clutch shift bar 290 when the latter is moved leftward to returning position. Said switch being connected in series between said spacing magnet and said selecting magnet and the source of power when thus open prevents further selecting or spacing during the return of the type wheel.

*The inking mechanism*

While different forms of inking devices may be used the one herein shown has been found suitable. The ink container-support 370 (Fig. 6) is carried on the spacing bracket 219 carried by the guide bar 218, movably longitudinally with the type wheel as the latter moves on the type shaft, and carries the container 371. A pair of inking roller levers 372 on the outer side faces of said container are fulcrumed at their inner ends on a fulcrum shaft 374 and are provided with a yoke 375 connecting their outer ends. An inking

roller 377 rotatably mounted in said container is provided with shaft ends 378 projecting through arcuate openings 379 in the sides of the container and rotatably journalled in said levers 372. A spring 380 tensioned between said yoke and a bracket 381 on the upper part of the tank, holds said inking roller yieldably raised against the type of the type wheel. A spreader 383 intermediately fulcrumed on said fulcrum shaft 374 within said container is provided with a rounded spreading portion 384 normally yieldably pressed into engagement with said inking roller. Cams 385 are carried on said guide bar 218 and are engageable by the projecting end of said spreader lever, whereby as said type wheel reaches either limit of movement, engagement of the cam by said projecting end causes said spreader to be moved out of engagement with the roller 377 and to dip into the ink at the bottom of the container. It is not necessary to provide both of the cams 385 and the device would be operative to ink the type wheel without either of the cams.

*The operation of the bulletin printing machine as a whole*

The operation of all of the mechanisms of the machine have been fully explained, and the operation of the machine as a whole may be only briefly described.

The roll 315 of paper is placed upon the supply roll 316 and the paper threaded around the various rolls as shown in Fig. 2, the locking lever 346 being raised to permit the web of paper to be passed around the feed roll 323.

The type wheel having been returned to initial position, the spacing lever of the typewriter may be depressed once or more thus closing the spacing switch 207 (Fig. 3) and spacing the type wheel to indent the line for the beginning of the paragraph. Then the words of the bulletin to be printed are spelled out upon the typewriter, a pause being made after each letter to give the magnet 235 time to act and release the key. Spaces between the word are made by depressing the spacing lever to close the spacing switch 207 and energize the spacing magnet 180 without operating the selecting mechanism.

When the end of the line is approached the type wheel may be returned by depressing the paper feed lever and closing the paper feed switch 246, thus setting in operation the paper feed, whereupon the clutch operating bar 290 Fig. 1) is shifted leftwardly, setting the return clutch in operation, and opening the cut-out switch 104, thus holding the selecting and spacing mechanisms inoperative until the type wheel is entirely returned. If more than one line space of paper is to be fed, the depression of the paper feed key-lever is repeated or continued.

If for any reason, the type wheel should be carried to the end of the line without depressing the paper feed key-lever, the safety lever 310 (Fig. 1) is actuated, thus returning the type wheel, during which time, the paper feed may be actuated once or more, by depressing the paper-feed key-lever as heretofore stated.

I claim as my invention:

1. A bulletin printing machine comprising typewriter mechanism provided with printing characters operated by a key board, movable means for printing provided with printing characters corresponding to the printing characters of the typewriter mechanism, a platen supported for engagement therewith of the characters of the means for printing, means cooperating between the typewriter mechanism and said means for printing for bringing characters of the means for printing into printing position for engagement with said platen during movement of said means for printing and operation of said key board and which characters correspond to the printing characters of the typewriter mechanism operated by said key board, and means comprising one revolution clutch means for moving the means for printing for spacing the characters thereof for engagement with said platen in suitable printing sequence.

2. A bulletin printing machine comprising typewriter mechanism provided with printing characters operated by a key board, a wheel having printing characters on its rim corresponding to the printing characters of the typewriter mechanism, a platen supported for engagement therewith of the printing characters of said wheel, means cooperating between the typewriter mechanism and said wheel for bringing into printing position for engagement with said platen during rotation of the wheel and operation of said key board characters of the wheel which correspond to the printing characters of the typewriter mechanism operated by said key board, and means comprising a one-revolution clutch means for moving said wheel laterally on its axis of revolution for spacing the characters thereof for engagement with said platen in suitable printing sequence.

3. A bulletin printing machine comprising typewriter mechanism provided with printing characters operated by keys normally in raised position and depressible for operation, movable means for printing provided with printing characters corresponding to the printing characters of the typewriter mechanism, a platen supported for engagement therewith of the characters of the means for printing, means cooperating between the typewriter mechanism and said means for printing for bringing the characters of the means for printing into print-

ing position for engagement with said platen during movement of said means for printing and operations of said keys and which characters correspond to the printing characters of the typewriter mechanism operated by said keys, means for moving the means for printing for spacing the characters thereof for engagement with said platen in suitable printing sequence, and means for maintaining a predetermined character operating key of the typewriter mechanism in depressed position during operation of said means for spacing and preventing depression of a second key from normal raised position before said means has operated.

4. A bulletin printing machine comprising typewriter mechanism provided with printing characters operated by keys normally in raised position and depressible for operation, a wheel having printing characters on its rim corresponding to the printing characters of the typewriter mechanism, a platen supported for engagement therewith of the printing characters of said wheel, means cooperating between the typewriter mechanism and said wheel for bringing the characters of the wheel into printing position for engagement with said platen during rotation of the wheel and operation of said keys and which characters correspond to the printing characters of the typewriter mechanism operated by said keys, means for moving said wheel, for spacing the characters thereof for engagement with said platen in suitable printing sequence, and means for maintaining a predetermined character operative key of the typewriter mechanism in depressed position during operation of said means for spacing and preventing depression of a second key from normal raised position before said means has operated.

5. A bulletin printing machine comprising typewriter mechanism provided with printing characters operated by keys normally in raised position and depressible for operation, movable means for printing provided with printing characters corresponding to the printing characters of the typewriter mechanism, a platen supported for engagement therewith of the characters of the means for printing, means cooperating between the typewriter mechanism and said means for printing for bringing the characters of the means for printing into printing position for engagement with said platen during movement of said means for printing and operation of said keys and which characters correspond to the printing characters of the typewriter mechanism operated by said keys, means for moving the means for printing for spacing the characters thereof for engagement with said platen in suitable printing sequence, means for maintaining a predetermined character operating key of the typewriter mechanism in depressed position during operation of said means for spacing and preventing depression of a second key from normal raised position before said means for spacing has operated, and mechanism for returning the means for printing to initial position.

6. A bulletin printing machine comprising typewriter mechanism provided with printing characters operated by keys normally in raised position and depressible for operation, a wheel having printing characters on its rim corresponding to the printing characters of the typewriter mechanism, a platen supported for engagement therewith of the printing characters of said wheel, means cooperating between the typewriter mechanism and said wheel for bringing the characters of the wheel into printing position for engagement with said platen during movement of said wheel and operation of said keys and which characters correspond to the printing characters of the typewriter mechanism operated by said keys, means comprising one-revolution clutch means for moving said wheel for spacing the characters thereof for engagement with said platen in suitable printing sequence, detent means for maintaining a predetermined character operating key of the typewriter mechanism in depressed position during operation of said means for spacing and preventing depression of a second key from normal raised position before said means for spacing has operated, and mechanism comprising one-revolution clutch means for returning said wheel to initial position.

7. In combination, a generator; a rotating type wheel; a revolving arm revolving therewith; a key board; a key-board switch comprising insulated flat springs operated by the key levers, and a lower conducting frame having contacts electrically connected thereto; a conducting line connected to one pole of said generator; a common conducting line connecting the other pole of the generator to said lower conducting frame whereby all of said conductings are connected to said second named pole; a commutator switch; conductors connecting said flat springs to the corresponding contacts on said commutator switch whereby when one of said key levers is depressed electrical connection is made between said common line and the corresponding commutator contact which said revolving arm will reach when the character on the type wheel corresponds to the depressed key lever, reaches printing position; a selector magnet for stopping said wheel and having one terminal electrically connected to said switch arm and the other to said common line.

8. In combination, a yieldably rotated type shaft; a type wheel non-rotatably splined on said shaft; an index wheel and a revolving switch arm fast on said shaft; a switch having an annular series of contacts each corresponding to a character on the

type wheel and engageable by the switch arm when such corresponding character is in printing position; a typewriter key board comprising key levers; individual switches operated by said levers respectively whereby a source of electric current is connected to the corresponding contact of said series; a platen; a device electrically connected to said arm and adapted, as said shaft rotates and the revolving arm comes into contact with the energized contact to the depressed key, to be operated to engage and stop the index wheel to stop the type in position relative to the platen to print the corresponding character; and a platen operating means comprising a one-revolution clutch set in operation by and on the actuation of said device to print the character.

9. In combination, a plurality of type; a key-board; selecting mechanism controlled by the key-board for selecting the type; printing mechanism for causing the type to print; a type spacing mechanism; detent means for holding the key-board inoperative until the spacing mechanism operates; a vertical releasing rod engageable under said detent for releasing the same; a release bracket secured to the lower part of the typewriter support and provided with a flat base and an upright bracket at one side of said base; an armature pivoted to the upper end of said upright bracket and provided with a releasing lever secured thereto and engaging under said rod, whereby when the armature is lowered said rod is raised; and a magnet for moving said armature.

10. In combination, key levers; a frame carried below said key levers and comprising an upper frame member and a lower conducting frame member, the latter being provided with a pair of series of upwardly opening plunger bores, the bores of one series being arranged in staggered relation with the bores of the next series; a board secured to said upper member; flat contact springs having their outer ends anchored near the outer part of the under face of said board and having their inner free ends operated by said levers; a cover plate mounted on the lower frame member and received and provided with small vertical bores co-axial with said lower bores; contact rods disposed in said small bores and normally out of contact with said button and engageable by said flat springs when depressed, and provided at their lower ends with terminal plungers; springs disposed in said lower bores and engageable with said plungers to yieldably hold said contact rods raised; selecting means comprising individual conductors connected to said flat springs; and a current source having one pole connected to the selecting means and the other to said lower frame member.

11. In combination, a typewriter having key levers; a frame carried below said key levers transversely to the plane of movement thereof and comprising an upper insulating frame member provided with a pair of series of upwardly opening plunger bores, the bores of the upper frame member being provided with reduced axial extensions passing entirely through said upper frame member; vertically movable plunger rods disposed in said bores and extensions, and engaging the lower face of corresponding key levers and provided intermediately with upwardly spring pressed plungers; an insulating board secured to the bottom face of said upper frame member and provided with perforations receiving said rods; flat contact springs having their outer ends anchored near the outer part of the under face of said board and having their inner free ends engaging said rods and provided on the lower face with contact buttons; common contact means engageable by said buttons; a type selecting means comprising individual conductors connected to said flat springs; and a source of current having one pole connected to said selecting means and the other to said contact means.

12. In combination, a yieldably rotated type shaft; a type wheel splined on said shaft; an index wheel fast on said shaft and provided with double shouldered peripheral teeth; a selecting device comprising a locking pawl to rise and engage the front face of one of said teeth to stop the wheel in printing position; and a recoil preventing detent carried on said locking pawl and constrained to rise into engagement with the rear face of the adjacent tooth just to the rear of said tooth engaged by the pawl.

13. In combination, a yieldably rotated type shaft; a type wheel splined on said shaft; an index wheel fast on said shaft and provided with double shouldered peripheral teeth and laterally projecting pins near said teeth; a selecting device adapted to be operated to engage and be moved by one of said pins just before the index wheel reaches printing position; movable means connected to said device comprising a cam collar; a pivotally mounted locking pawl provided with a cam face engageable by said cam collar to raise the pawl to engage the front shoulder of one of said teeth to stop the wheel in printing position; and a recoil preventing detent carried on said locking pawl and adapted to rise into engagement with the rear face of the adjacent tooth just to the rear of said tooth engaged by the pawl thereby to prevent recoil movement of the index wheel, the type shaft or the parts carried thereby.

14. In combination, a type; a selecting mechanism for selecting the type comprising an upwardly movable locking pawl; printing mechanism for pressing paper against the type; a laterally projecting clutch-operation initiating-pin fast on said locking pawl; a vertical releasing link provided at its upper

end wi h a vertical slot provided with an under cut shoulder adapted to engage over said pin; an elbow lever fulcrumed at its elbow part having the free end of its motive arm pivotally connected to the lower end of said link; a printing shaft; a drive member; a clutch interposed between said shaft and member and normally held in-operative by the elbow lever and permitted to operate by movement of the elbow lever when said pawl rises; and a link releasing cam carried on said printing shaft and adapted to engage said link to release said shoulder from said printing pin before said printing shaft performs a complete revolution, whereby said active arm will move to position to disable the clutch.

15. In combination, a type; a selecting mechanism for selecting the type comprising an upwardly movable locking pawl; printing mechanism for pressing paper against the type; a laterally projecting clu ch-operation initiating-pin fast on said locking pawl; a vertical releasing link provided at its upper end with a vertical slot provided with an under-cut shoulder adapted to engage over said pin; an elbow lever fulcrumed at its elbow part having the free end of its motive arm pivotally connected to the lower end of said link; a pawl carrying disk; a printing shaft carrying said disk and operating the printing mechanism; a drive ratchet wheel co-axial with said link; a spring pressed pawl pivotally mounted on said disk and adapted to be yieldably spring pressed into engagement with said ratchet and engaged by the active arm of said elbow lever thereby to hold the pawl out of engagement with said ratchet wheel; and a link releasing cam carried on said printing shaft and adapted to engage said link to release said shoulder from said printing pin before said printing shaft performs a complete revolution, whereby said active arm will engage said spring pressed pawl and release it from said ratchet wheel.

16. In combination, a plurality of type; printing mechanism for pressing paper against the type; a printing initiating lever; a printing shaft; a pawl carrying disk fast thereon; a drive gear; a ratchet wheel fast on said gear; and a spring pressed pawl pivotally mounted on said disk and adapted to be yieldably spring pressed into engagement with the teeth of said ratchet and provided with a tail normally engaged by the active arm of said elbow lever thereby to hold said pawl out of engagement with said ratchet wheel; a latch releasing cam mounted on said printing shaft and operatively associated with said lever to cause the latter to engage said tail on a complete rotation of the printing shaft; and an upwardly disposed printing link eccentrically pivoted to said printing shaft and operating the printing mechanism.

17. In combination, an initiating lever; a driven shaft; a pawl carrying disk fast thereon; a drive gear on the counter shaft; a ratchet wheel fast on said gear; and a spring pressed pawl pivotally mounted on said disk and adapted to be yieldably spring pressed into engagement with the teeth of said ratchet and provided with a tail normally engaged by the active arm of said lever thereby to hold said pawl out of engagement with said ratchet wheel, whereby the driven shaft is allowed to remain stationary when said locking pawl is in lowered position, and said elbow lever operates said active arm and is caused to release said tail to permit said disk to rotate; and means operatively associated with said lever to cause the latter to engage said tail on a complete rotation of the driven shaft.

18. In combination, a frame; a rotating type wheel; printing mechanism for pressing paper against the type comprising an upwardly disposed link; a rocking shaft mounted on the frame; a link arm mounted on said rocking shaft and pivotally connected to the upper end of said upwardly disposed link; an upwardly disposed printing bar pivotally connected at its lower end to the moving end of said link arm; an upper toggle elbow lever fulcrumed at its elbow part on said frame and having its motive arm pivotally connected to said upright printing bar; a vertically movable platen bar disposed across said frame above said type wheel; a toggle link connected to the free end of the motive arm of said toggle lever and having its lower end pivotally connected to said platen bar; a set of toggle links pivotally connecting the opposite end of said platen bar to the other side frame member; and having its respective members parallel to said active arm and said first mentioned toggle link; and a synchronizing bar connecting the mid pivots of said toggles.

19. In combination, a yieldably rotated type shaft; a type wheel splined on said shaft; an index wheel fast on said shaft and provided with laterally projecting pins; a pivoted selecting device adapted to be operated to engage and be moved by one of said pins as the index wheel nears printing position, and comprising a pair of stop latches normally out of contact with said pins and adapted when released to engage said pins; an inwardly turned tail formed on the fulcrum end of each latch; a pair of selector magnets; individual armatures for the respective selector magnets for releasing said latches; stop means movable by said device to stop the wheel in printing position; a printing shaft set in operation by said stop means and carrying a releasing cam; and a releasing lever provided with a motive arm engageable by and depressible by said releasing cam after the printing operation has taken place, and provided with an active arm

engageable under said tails thereby to release said latches from the index pins.

20. In combination, a one-revolution printing shaft; a printing mechanism; a link eccentrically pivoted at one end to said shaft and operating said mechanism; a laterally projecting spacing initiating bar pivotally connected at its inner end to said link whereby as the motive end of said link is eccentrically moved said initiating bar will have a reciprocating motion, said bar being bifurcated at its outer end to form a slot; a yieldably open spacing switch provided with a pivoted contact lever having a pin engageable in said slot, and a contact member whereby said switch is closed by said initiating bar after the printing operation has taken place; a spacing magnet electrically connected in series with the terminals of said spacing switch; and a spacing mechanism set in operation by said magnet.

21. In combination, a plurality of type; selecting mechanism for selecting the type; printing mechanism for pressing paper against the type; a spacing magnet energized by the operation of the printing mechanism; an armature pivotally connected in front of said magnet; a spacing connecting link pivotally connected to said armature; a pawl detent rocking shaft carrying a downwardly projecting arm pivotally connected to said spacing link; an upwardly pointed detent carried on said rocking shaft; a driving counter shaft; a ratchet wheel fast on said counter shaft; a spacing gear loosely mounted on said counter shaft and provided with a pawl carrying disk adjacent to said ratchet wheel; a spring pressed clutch pawl intermediately pivotally connected on said disk for yieldable engagement with said ratchet and normally engaged by said detent, whereby the pawl is held out of engagement with said teeth; the energizing of said spacing magnet causing said detent to be removed from engagement with said pawl to permit the pawl to be spring pressed into engagement with said ratchet and cause one rotation of the spacing gear, the energizing of said spacing magnet being of short duration; and spacing mechanism operated by said gear.

22. In combination, a yieldably rotated type shaft; a type wheel slidably splined on said shaft and provided with a hub having an annular groove; a one-revolution spacing clutch provided with a spacing gear driven thereby; a horizontally spacing lead screw shaft mounted below said wheel parallel to said shaft; a spacing clutch gear loosely mounted on said shaft and engaging said spacing gear and provided with an outwardly pointing hub provided with teeth; a slidable clutch member splined on said lead screw shaft to constrain the shaft to rotate therewith and provided with clutch teeth normally engaging the teeth of said hub; a guide bar near and parallel to said lead screw shaft; and an upright bracket on said guide bar and provided at its lower end with a lead-nut embracing the threads of the lead-screw shaft, and provided at its upper end with a bifurcated yoke engaging in said annular groove; the pitch of the lead-threads being such that as the spacing gear rotates one revolution the clutch gear will engage said clutch member and rotate said shaft sufficiently to cause said spacing bracket and type wheel to move along the type shaft and lead screw shaft, one letter space distance.

23. In combination, a key board having individual switches; a rotating type wheel; selecting mechanism controlled by the key board for selectively stopping the type wheel in printing position; printing mechanism for pressing paper against the type; a type spacing mechanism; a paper feed mechanism; a type wheel return mechanism; and a combined operating mechanism controlled by the depression of a key lever for operating the paper feed mechanism and the return mechanism; said combined mechanism comprising a paper feed magnet connected in series with said key lever switches and provided at its lower end with a yieldably downwardly moved paper feed armature; a downwardly disposed link pivoted to the free end of said armature; a pawl detent rocking shaft mounted on said frame near the lower end of said link and carrying at one end a horizontal projecting arm pivotally connected to said line spacing link; a downwardly pointed detent carried on said rocking shaft; and means comprising a one-revolution clutch set in operation by said detent for feeding the paper and returning the type wheel.

24. In combination, a selective printing type device; a type spacing mechanism therefor; a paper feed mechanism; a printing device; a return mechanism; and a combined operating mechanism for operating the paper feed mechanism and the return mechanism; said combined mechanism comprising a positively rotated ratchet wheel; a loosely mounted pawl carrying disk adjacent to said ratchet wheel; a line spacing or paper feed eccentric disk fast on said pawl carrying disk; a clutch pawl intermediately pivotally fulcrumed on said disk and adapted for engagement with the teeth of said ratchet; means for carrying said pawl to engage the ratchet wheel through one rotation; a paper feed bell-crank lever fulcrumed at its elbow part and having a motive arm widely forked and provided at the extremities of the fork prongs with rollers engaging said eccentric on opposite sides whereby when said disk is revolved the paper feed lever will be given one complete oscillation; and means connecting the active arm of said paper feed lever

with the paper feed mechanism and the return mechanism.

25. In combination, a selective printing type device; a type spacing mechanism therefor; a paper feed mechanism; a printing device return mechanism; a key lever switch; and a combined operating mechanism set in operation by the key lever switch for operating the paper feed mechanism and the return mechanism; repeated depression of the key lever bringing about repeated operations of the paper feed mechanism during the time in which the printing device is being returned, or after it has been returned.

26. In combination, a selective printing device; a type spacing mechanism therefor; a printing device return mechanism; an operating mechanism for setting in operation the return mechanism; and a detent for locking said return mechanism in returning position and releasable by contact with the returned printing device, thereby to disable the return mechanism.

27. In combination, a selective printing device; a spacing mechanism for moving the printing device in one direction; a printing device return mechanism for moving the device in the return direction and a mechanism for setting in operation the return mechanism and comprising an actuating link rod; an elbow lever having its motive arm horizontally disposed and provided with a turn down end and provided with an outwardly turned perforated ear receiving said link rod and engaged on its lower face by the nut at the lower end of the link rod whereby when said rod is raised said elbow lever is oscillated; the printing device return mechanism being held in operation by the lower free end of the downwardly pointing active arm of said elbow lever, when said down turned end is raised; a sliding detent adapted to be yieldably moved under said down turned end when the latter is raised thereby to lock said return mechanism in returning position until said device is returned to initial position, whereby said slidable detent is engaged by said device and removed from elbow-lever-detaining position, thereby to cause said elbow lever to resume normal position and the return mechanism to become disabled.

28. In combination, a slidable selective printing device; a type spacing mechanism therefor comprising a lead screw and an upright bracket engaging said device; a bracket return initiating device comprising a clutch shift lever; a slidably disposed clutch reversing bar near said lead screw and having one end pivoted to said lever; a positively driven spacing clutch gear and a positively driven return clutch gear loosely mounted on said shaft; a slidable clutch member splined on said lead screw shaft and normally locking with said spacing gear; a clutch shift bracket fast on said shift rod and engaging the clutch member and engageable with said return gear when the clutch member is moved away from the spacing member; and a spring for holding the clutch member in engagement with said spacing gear.

29. In combination, a slidable selective printing device; a type spacing mechanism therefor comprising a lead screw and an upright bracket engaging said device; a bracket return initiating device comprising a clutch shift lever; a slidably disposed clutch reversing bar near said lead screw and having one end pivoted to said lever; a positively driven spacing clutch gear and a positively driven return clutch gear loosely mounted on said shaft; a slidable clutch member splined on said lead screw shaft and normally locking with said spacing gear; a clutch shift bracket fast on said shift rod and engaging the clutch member and engageable with said return gear when the clutch member is moved away from the spacing member; a spring for holding said member in engagement with the spacing gear; a detent for holding said member in engagement with said return gear; and means for releasing the clutch member when said device is returned.

30. In combination, a selective printing device; a type spacing mechanism therefor comprising a lead screw and an upright bracket engaging said device; a return initiating device comprising a clutch shift lever; a clutch reversing bar slidably disposed near said lead screw and having one end pivotally connected to the lower end of said lever; a pair of lead screw brackets; a clutch shift rod slidable in said brackets and connected to the shift bar; an intermittently positively driven spacing clutch gear loosely mounted on said shaft and provided with a hub provided with clutch teeth; a slidable clutch member splined on said lead screw shaft and provided with a cone-shaped friction disk, an annular groove, and teeth normally engaging said clutch teeth; a clutch shift bracket fast on said rod and engaging in said groove; and a positively driven return clutch gear loosely mounted on said lead screw shaft and provided with a cone shaped recess adapted to engage said friction disk when the latter is moved thereto.

31. In combination, a frame having a base; and lead screw brackets on said base; a selective printing type device slidable thereon; a type spacing mechanism therefor comprising a lead screw in said brackets and an upright bracket engaging said device; a bracket return initiating device comprising a clutch shift lever pivoted on said frame; a clutch reversing rod slidably disposed across the lower part of said frame near said lead screw and having one end pivotally connected to the lower end of said lever; a clutch shift bar slidably mounted in said lead screw

brackets substantially in alinement with said shift bar and pivotally connected to the shift bar; a spacing clutch gear loosely mounted on said shaft and engaging said spacing gear and provided with an outwardly pointing hub provided with a slidable clutch member splined in said lead screw shaft to constrain the shaft to rotate therewith and provided with an intermediate annular groove and clutch teeth normally engaging the teeth of said hub; a clutch shift bracket fast on said shift rod and engageable in said annular groove of the clutch member; and a positively driven return clutch gear loosely mounted on said lead screw shaft provided with a cone shaped recess adapted to engage said friction disk when the latter is moved leftwardly.

32. In combination, a slidable selective printing device; a type spacing mechanism therefor comprising a lead screw and an upright bracket engaging said device; a bracket return initiating device comprising a clutch shift lever; a slidably disposed clutch reversing bar near said lead screw and having one end pivoted to said lever; a positively driven spacing clutch gear and a positively driven return clutch gear loosely mounted on said shaft; a slidable clutch member splined on said lead screw shaft and normally locking with said spacing gear; a clutch shift bracket fast on said shift rod and engaging the clutch member and engageable with said return gear when the clutch member is moved away from the spacing member; a detent for locking said member in engagement with the return gear and releasable by said device when it is returned; a safety lever adapted to be oscillated by said device as the device approaches the end of the line; and a pin carried on said clutch shift bar whereby said clutch bar is forced to returning position thereby to cause the clutch member to engage in the return gear and the detent to lock said member until the printing device is returned to initial position.

33. In combination, a frame comprising side members; a selective printing device thereon; a platen across said frame just above said device; a supply roll on the frame guide rolls at the front and rear of said platen; a top roll on said frame; a feed roll across said frame about midway between said upper and lower guide rolls and having shaft ends rotatably mounted on the side members; and a removable take-up roll on said frame; paper from said supply roll passing beneath said lower guide rolls and platen, above and over said upper guide roll under the feed roll and around the take-up roll.

34. In combination, a frame comprising side members; a selective printing device thereon; a platen across said frame just above said device; a supply roll; guide rolls at the front and rear of said platen; a top roll on said frame; a feed roll across said frame about midway between said upper and lower guide rolls and having shaft ends rotatably mounted on the side members; a removable take-up roll on said frame; paper from said supply roll passing beneath said lower guide rolls and platen, above and over said upper guide roll under the feed roll and around the take-up roll; a ratchet wheel fast on one of said shaft ends; a pawl lever fulcrumed on said shaft end and provided with a pawl yieldably held in engagement with the teeth of said ratchet wheel; a positively oscillatory feed lever; and a feed link pivotally connected to said pawl lever and the active arm of said feed lever.

35. In combination, a frame comprising side members; a selective printing device thereon; a platen across said frame just above said device; a supply roll; guide rolls at the front and rear of said platen; a feed roll across said frame; a removable take-up roll on said frame; paper from said supply roll passing beneath said guide rolls and platen under the feed roll and around the take-up roll; a presser roll shaft rotatably mounted between said side members beneath said feed roll; presser roll brackets fast on said shaft carrying at their outer ends presser rolls adapted to press upon the paper on the feed roll; a motive arm fast on said presser roll shaft; and a locking lever pivoted on the free end of said motive arm and provided at its fulcrumed end with a locking lug adapted when the lever is lowered to engage substantially perpendicularly against the side member thereby to force and lock the presser rolls in firm engagement with the paper.

36. In combination, a frame comprising side members; a selective printing device thereon; a movable platen across said frame just above said device; a supply roll at the back of said frame and having shaft ends removably received on the frame; a tension roll beneath the said supply roll; front and rear lower guide rolls at the front and rear of said platen and having stub shaft ends received in the frame; a removable take-up roll; an intermediate roll between the tension roll and guide rolls; the paper from said supply roll passing beneath said tension roll, over said intermediate roll, beneath said guide rolls and around the take-up roll; a pair of supporting arms fast on said shafts of the rear lower guide roll and rotatably supporting said floating tension roll; a lug fast on one of said shafts; a brake rod resting on said lug and vertically guided in said frame and yieldably spring pressed downwardly against the lug; a brake drum fast on one of the shaft ends of said supply roll; and a brake lever pivoted on said presser roll

shaft and provided with a shoe engaging said drum, and pivotally connected to the upper end of said brake rod.

37. In combination, a frame having a base; a slidable selective printing device; a type spacing mechanism therefor comprising a lead screw and an upright bracket engaging said device; a bracket return initiating device comprising a clutch shift lever; a slidably disposed clutch reversing bar on said base near said lead screw and having one end pivoted to said lever; a positively driven spacing clutch gear and a positively driven return clutch gear loosely mounted on said shaft; a slidable clutch member splined on said lead screw shaft and normally locking with said spacing gear; a clutch shift bracket fast on said shift rod and engaging the clutch member; a return clutch gear loosely mounted on said shaft and engageable by said clutch member when the clutch member is moved away from the spacing member; a source of current; electric means for operating said device and said spacing mechanism; and a cut-out switch carried on said base and engageable by said clutch shift bar when the latter is moved to returning position; said switch being connected in series between said electric means and said selecting magnet and said source of current, thereby to prevent further selecting or spacing during the return of the printing device.

38. In combination, a selective printing device; a type spacing mechanism and return therefor; an inking means for said device comprising an inking roller; a spreader engageable with said roller; and means for automatically moving the spreader to or from the roller for certain positions of the device.

39. In combination, a frame; a yieldably rotated type shaft thereon; a type wheel splined on said shaft to rotate therewith; a selecting device, and a spacing and return mechanism for the type wheel comprising a horizontal lead screw mounted on the lower part of said frame; a guide bar near and parallel to said lead screw shaft; a spacing bracket on said guide bar and having a lead nut embracing the lead screw, and at its upper end engaging said type wheel; an ink container supported on said bracket and movably longitudinal with the type wheel and provided with lateral openings; inking roller levers fulcrumed at their inner ends on the outer side faces of said container and provided with a yoke connecting their outer ends; an inking roller in said container and having shaft ends projectng through said openings, and journalled in said levers; and a spring tensioned between a bracket on the container and said yoke whereby said inking roller is yieldably raised against the type.

40. In combination, a type shaft; a type wheel slidably splined on said shaft to rotate therewith; a selecting device for said wheel; a type spacing and return mechanism for the wheel comprising a guide bar and an upright spacing bracket slidably moved on said guide bar and engaging said wheel; an ink container carried on said bracket and having an ink roller engaging the type wheel; a spreader intermediately fulcrumed on said container and provided with a concaved spreading portion normally yieldably pressed into engagement with said inking roller; and cams carried on said guide bar and engageable by the projecting end of said spreader lever, whereby as said type wheel reaches either limit of movement of the bar, engagement of the cam by said projecting end causes said spreader to be moved out of engagement with the roller and to dip into the ink at the bottom of the container.

41. In combination, a plurality of type; selecting means for selecting the type; printing means for causing the type to print; a type spacing mechanism; electric means set in operation by the printing means for causing the spacing mechanism to operate; means including a detent for holding the selecting means set until the spacing mechanism operates; and releasing means also set in operation by said printing means as it causes the spacing mechanism to operate for disabling the detent means.

42. In combination, a plurality of type; a selecting mechanism for selecting the type including an upwardly movable member; a pin on said member; a releasing link provided at its upper end with a vertical slot provided with an undercut shoulder adapted to engage over said pin; a drive member; a printing shaf.; a clutch interposed between said shaft and drive member and operated by said link; and a link releasing cam carried on said printing shaft and adapted to engage said link to release said shoulder from said printing pin as said printing shaft performs a complete revolution, whereby said clutch will be disabled.

43. In combination, a rotating type wheel; a switch arm rotating therewith; a commutator switch having contacts engageable by said arm; a typewriter including a platen, key levers and type bars mechanically connected to and operated by the levers to print on the platen; individual switches engaged by the key levers; individual conductors connecting the respective individual switches to the respective contacts; an electrical selecting mechanism electrically connected to said arm for selectively stopping the type wheel; and means for pressing paper against the type of the wheel.

44. In combination, a type; a type wheel rotated thereby; means for selectively stopping the wheel; a loose member on said shaft; a friction disk on said shaft and engaging the loose member and constrained to rotate with said shaft; an adjusting nut on said

shaft; and spring means interposed between said disk and nut to cause said disk to engage said loose member.

45. In combination, a shaft; a type wheel positively rotated thereby; selecting means for stopping the wheel; a loose member mounted on said shaft; means for rotating the loose member; a friction disk on said shaft and engaging said loose member and constrained to rotate with said shaft; arms pivoted on said loose member and engaging said disk; an adjusting nut on said shaft; and a spring means interposed between said nut and arms to cause said friction disk to engage said loose member.

46. In combination, a rotating type shaft having a type wheel splined thereon to rotate therewith; selecting mechanism for selectively stopping the type wheel in printing position; a loose member mounted on one end of said type shaft; means continuously rotating the loose member; a friction disk mounted on said type shaft and engaging the outer face of said loose member and constrained to rotate with said shaft; a pair of lever arms pivotally mounted near the periphery of the outer face of said loose member and intermediately engaging said friction disk and having their inner free ends disposed near said shaft; an adjusting nut on the end portion of the shaft; a collar on said end portion between said nut and said inner ends and engaging said inner ends; and a spring compressed between said collar and nut to cause said friction disk to engage said loose member whereby when said loose member is positively rotated by the motor, the type shaft will be yieldably rotated.

47. In combination, an electrically controlled typewriting machine, an electric generator supplying suitable current for controlling the machine; a motor operated by a commercial current unsuitable for said machine; a shaft direct-connecting said motor to said generator and driving said machine.

48. In combination, a base; a frame thereon; a motor bracket disposed on said base; a direct-connected set mounted on said bracket comprising a motor suitable for the commercial current which is to operate the machine, a generator for generating current suitable for the operative parts of the machine, a connecting shaft direct-connecting said motor and generator; a type shaft rotated on said frame from said connecting shaft; a type wheel thereon provided with printing type; selecting mechanism for stopping the type; all of said means and mechanisms being electrically controlled by current from said generator.

49. In combination, a base; a motor bracket disposed on said base; a direct connected set mounted on said bracket comprising a motor suitable for the commercial current which is to operate the machine, a generator for generating current suitable for the operative parts of the machine; a connecting shaft connecting said motor and generator; a worm carried on said connecting shaft between said motor and generator; a counter shaft mounted above said worm; a worm wheel thereon engaging said worm; a shaft rotating gear mounted on said counter shaft; a type shaft rotated by said gear; a type wheel thereon provided with printing type; selecting mechanism for stopping the type; printing mechanism for causing the type to print; a type spacing mechanism; detent means for holding the selecting mechanism inoperative until the spacing mechanism operates; and a paper feed mechanism, all of said means and mechanisms being electrically controlled by current from said generator.

50. In combination, a plurality of type; a settable means settable for selecting the type; printing means for causing the type to print; a type spacing mechanism set in operation by the printing means; and means for holding the settable means set until the spacing mechanism operates.

51. In combination, a plurality of type; a plurality of keys respectively settable for selecting the type; printing means for causing the type to print; a type spacing mechanism set in operation by the printing means; and means for holding a set key set until the spacing mechanism operates.

52. In combination, a selective printing device; a type spacing mechanism therefor; a printing device return mechanism; a paper feed mechanism; a combined operating mechanism controlled by a shift member for operating the paper feed mechanism and the return mechanism; and means controlled by the shift member disabling said printing device and spacing mechanism during the operation of the return mechanism.

53. In combination, a selective printing device; a type spacing mechanism therefor; electric means for operating said device and mechanism; a printing device return mechanism; a paper feed mechanism; a combined operating mechanism for operating the paper feed mechanism and the return mechanism; and a switch controlling said electric means and actuated by the combined mechanism, for disabling said printing device and spacing mechanism during the operation of the return mechanism.

54. In combination, a slidable selective printing device; a type spacing mechanism therefor; a return initiating device comprising a shift lever; means for operating said device and said spacing mechanism and comprising a part controlled by said lever when the latter is moved to returning position, thereby to disable said device and spacing mechanism to prevent further selecting or spacing during the return of the printing device.

55. In combination, a slidable selective printing device including a selecting magnet; a type spacing mechanism therefor comprising a lead screw and a bracket engaging said device; a return initiating device comprising a clutch shift lever; a slidably disposed clutch reversing bar having one end pivoted to said lever; a positively driven spacing clutch gear; a positively driven return clutch gear; a slidable clutch member connected to said lead screw shaft and normally locking with said spacing gear; a clutch shift bracket fast on said shift rod and engaging the clutch member and adapted to move the clutch member into locking engagement with the return clutch gear; electric means for operating said printing device and said spacing mechanism; and a cut-out switch engageable by said clutch shift bar when the latter is moved to returning position and controlling current for said electric means, to prevent further selecting or spacing during the return of the printing device.

Signed at New York, in the county of New York and State of New York, this 6th day of February, A. D. 1929.

THOMAS W. MacKENZIE.