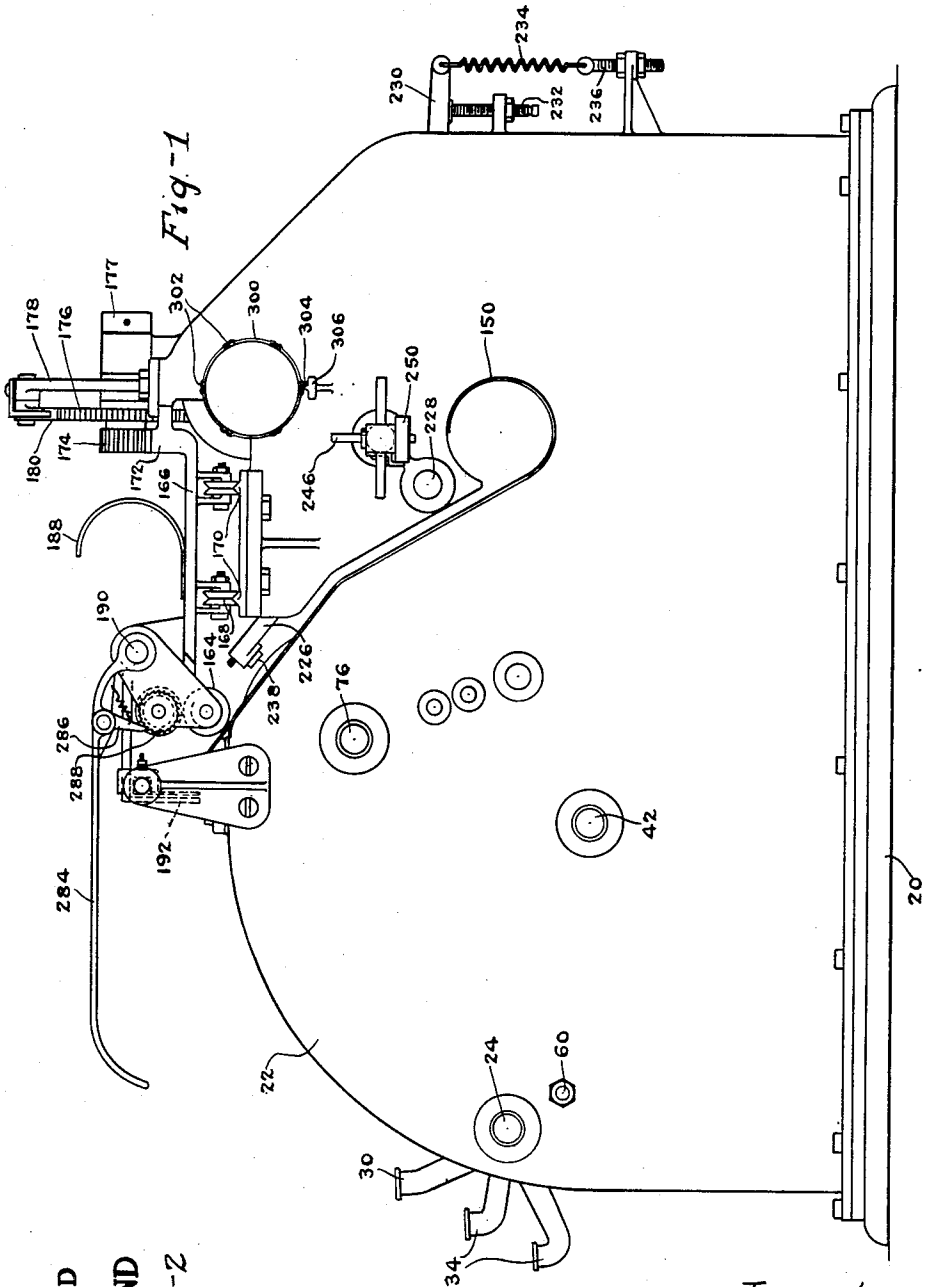
April 9, 1929. R. J. ANDERSON 1,708,750

PRINTING MACHINE

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Fig. 1



AND

AND

Fig. 2

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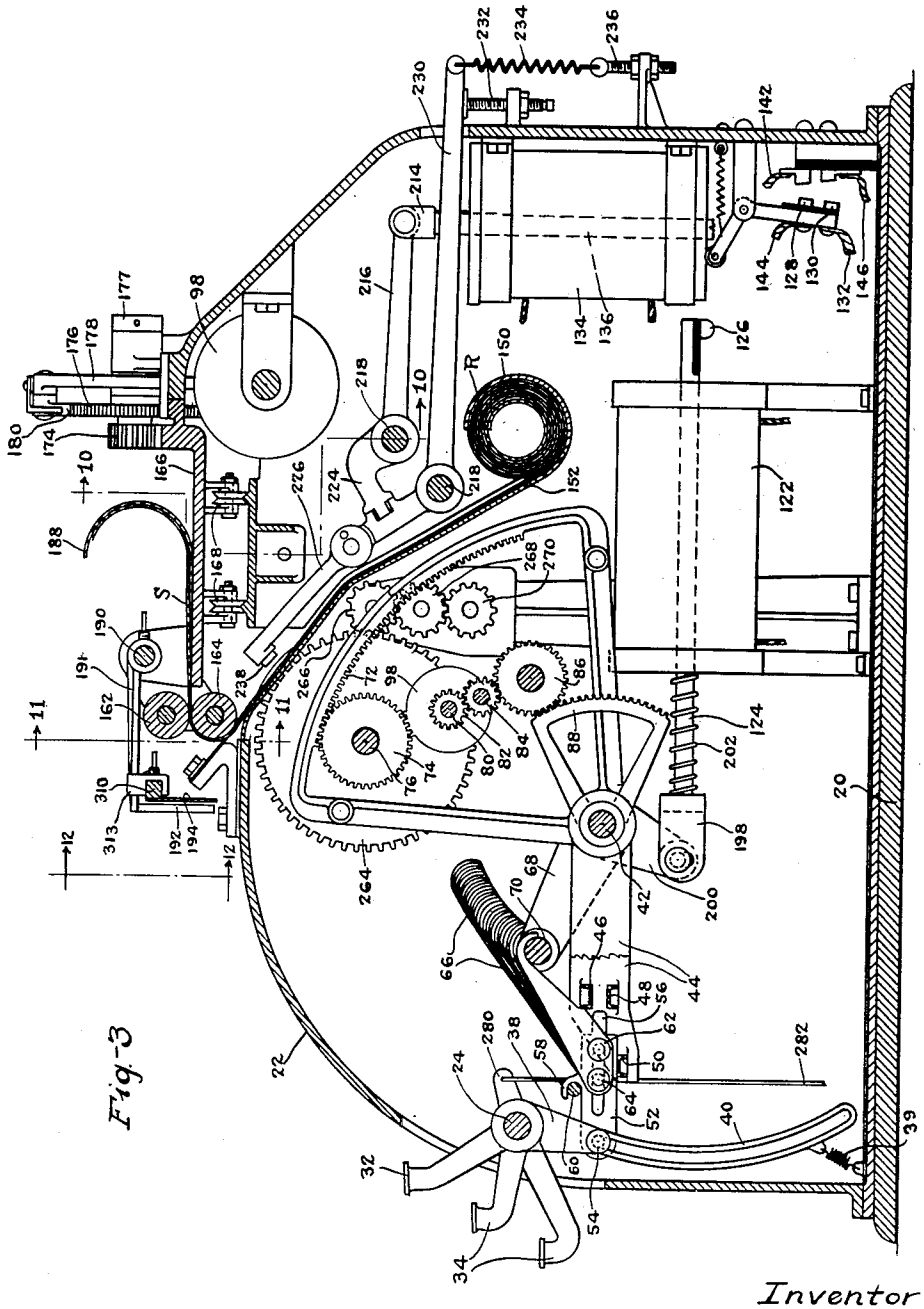


Fig-3

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PRINTING MACHINE

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Fig-4

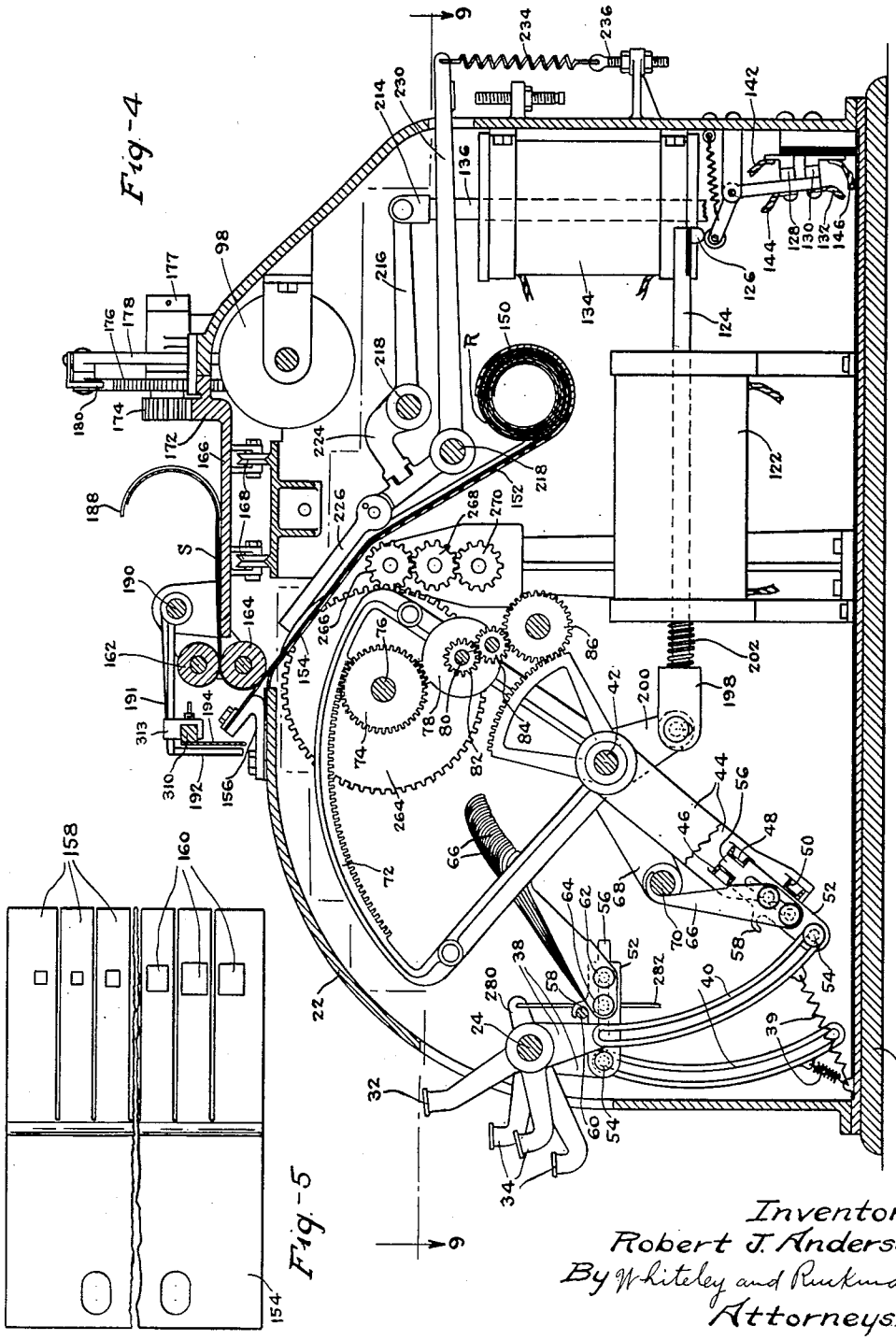


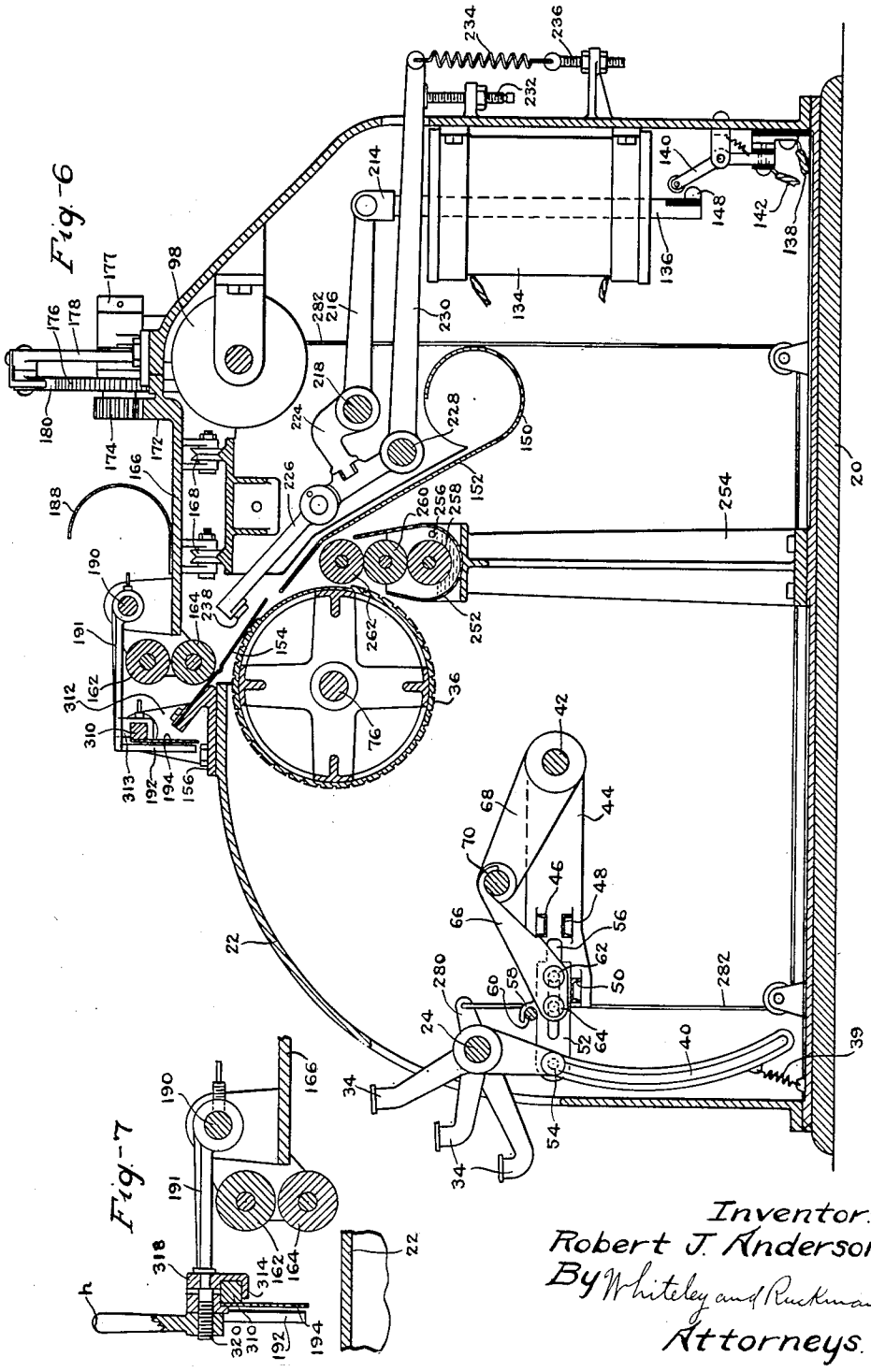
Fig-5

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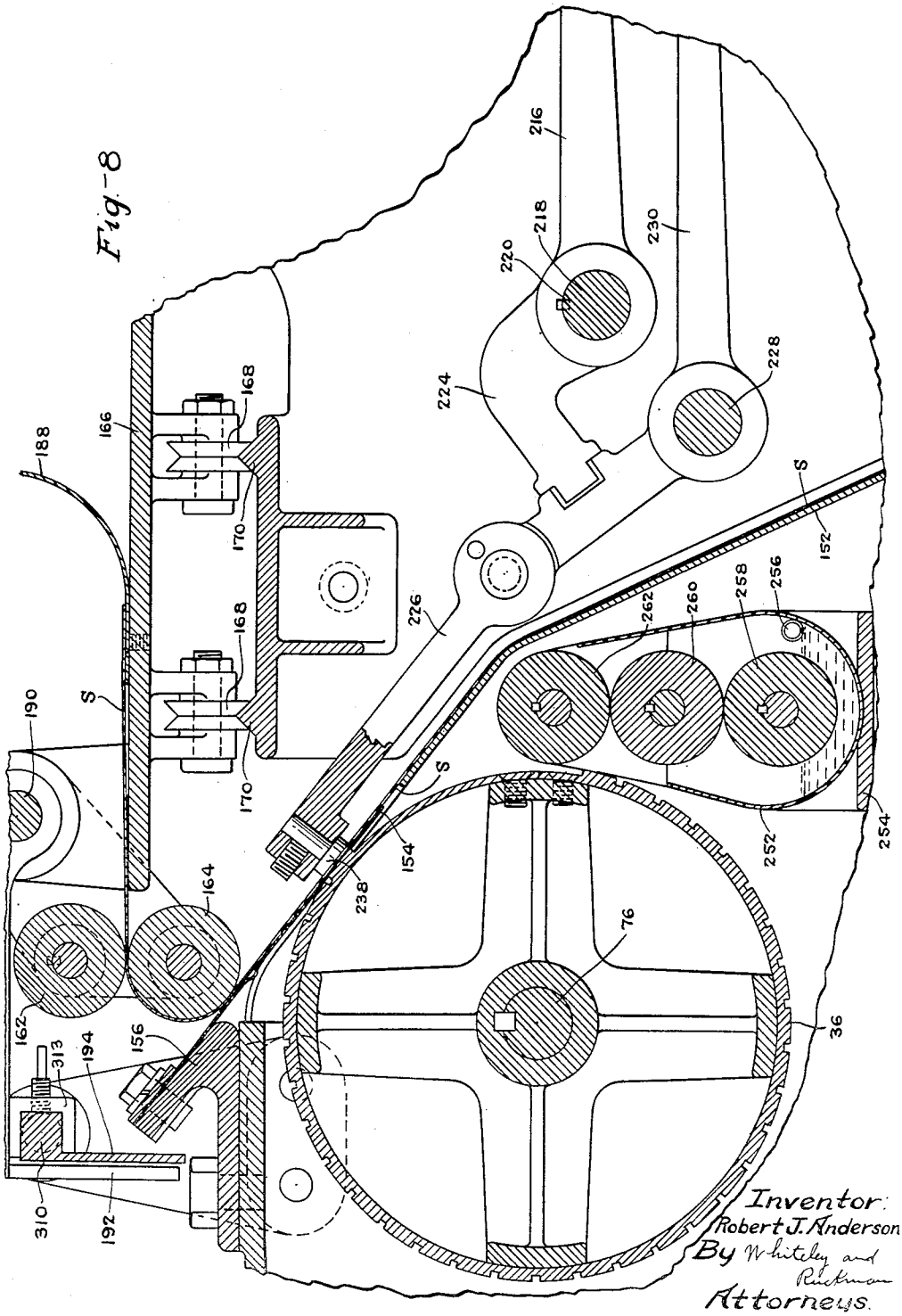
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PRINTING MACHINE

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Fig. 8



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PRINTING MACHINE

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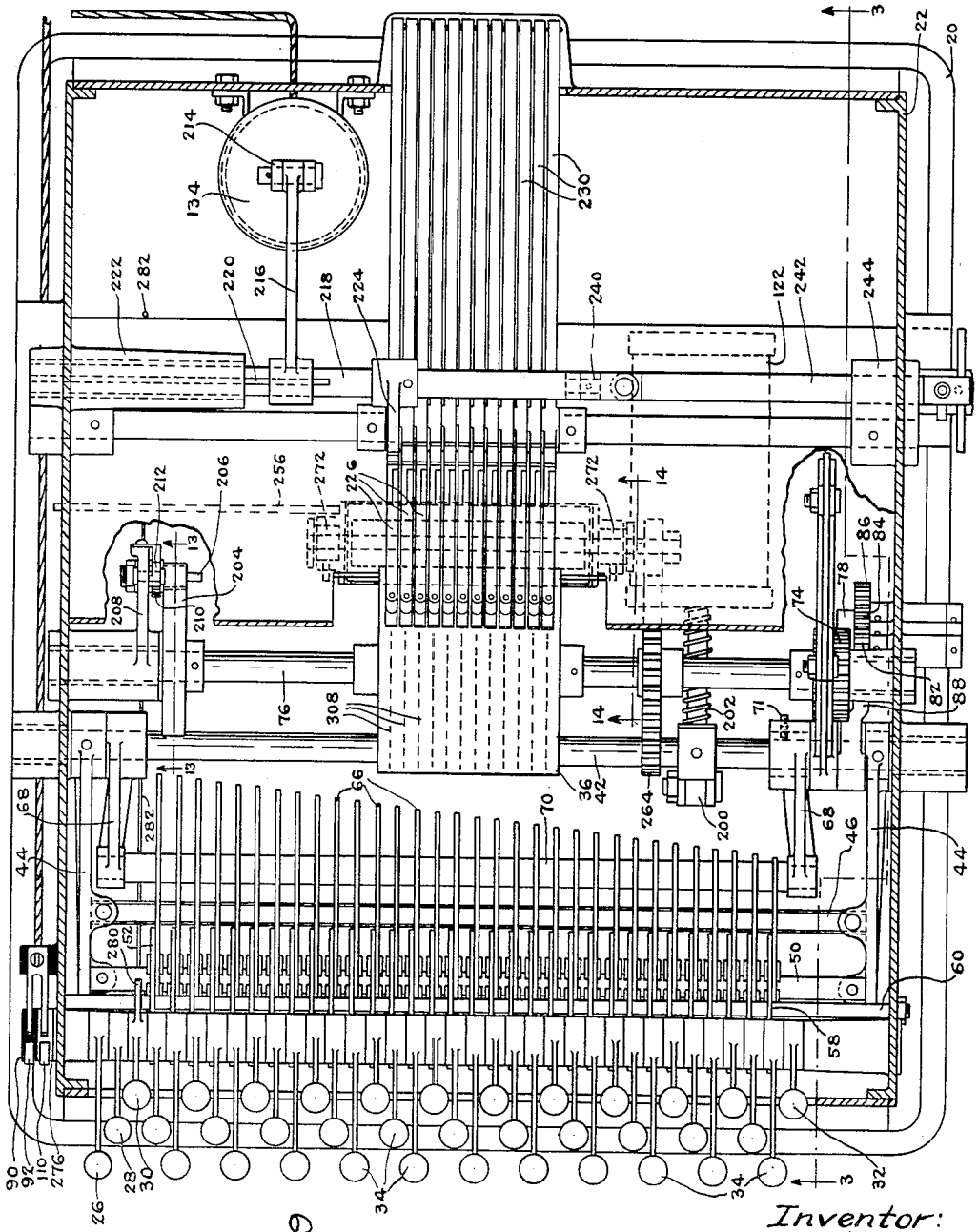


Fig-9

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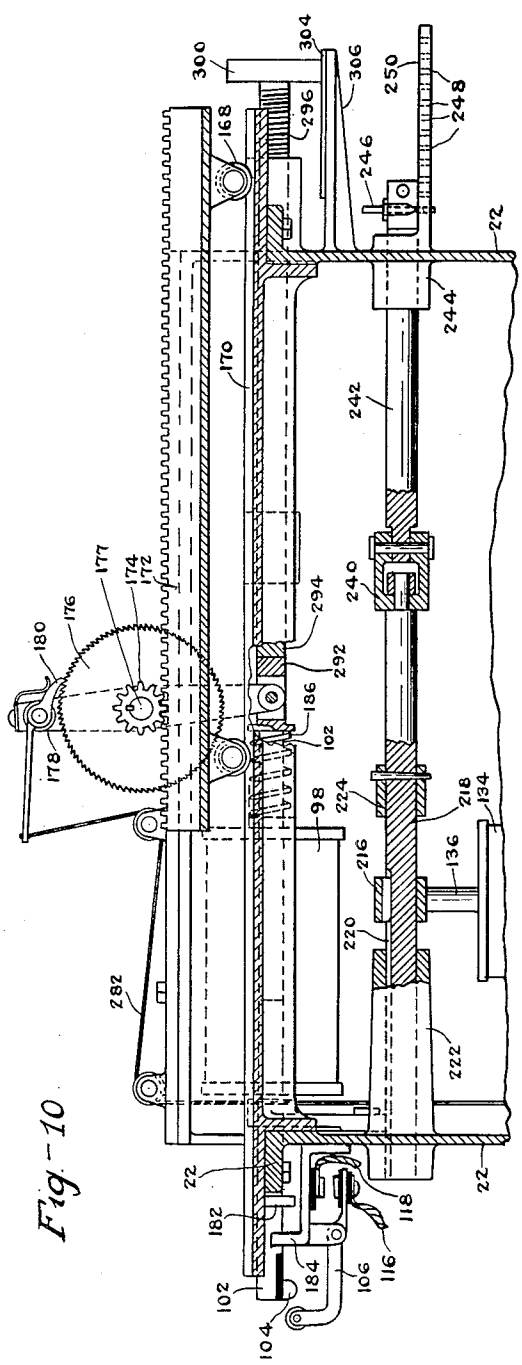


Fig. 10

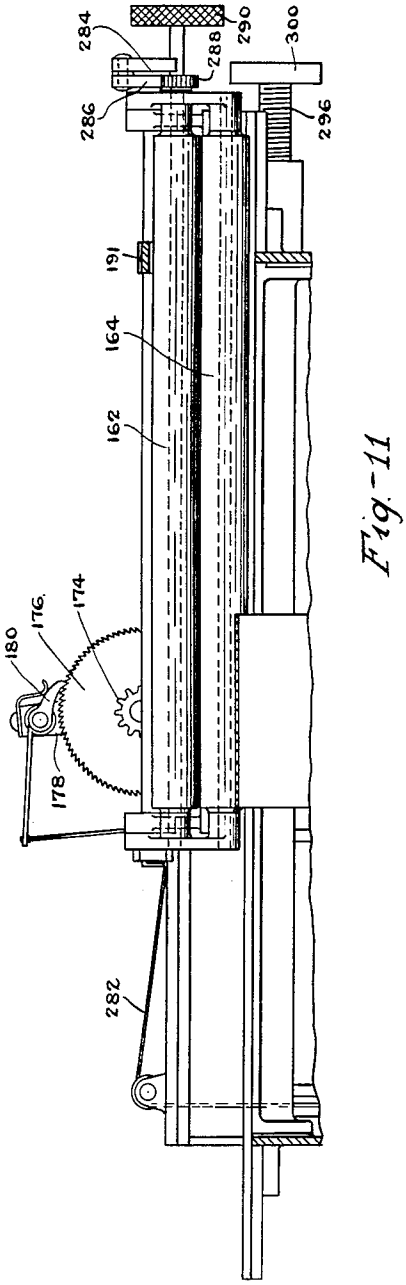


Fig. 11

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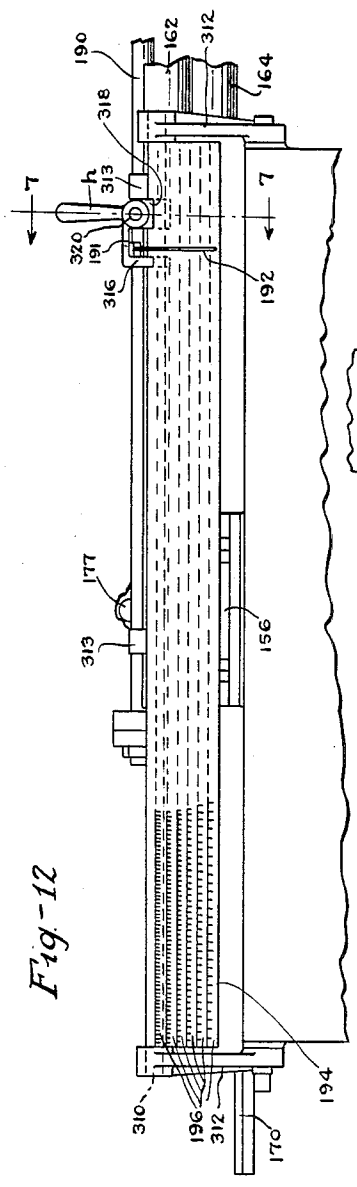


Fig. 12

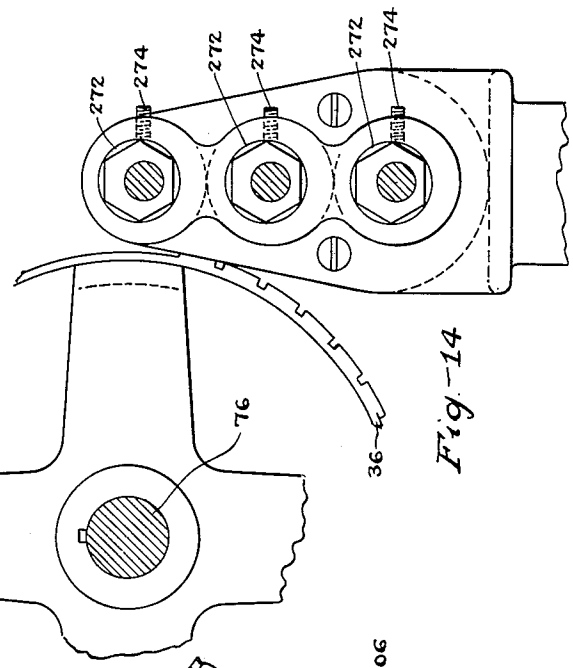


Fig. 14

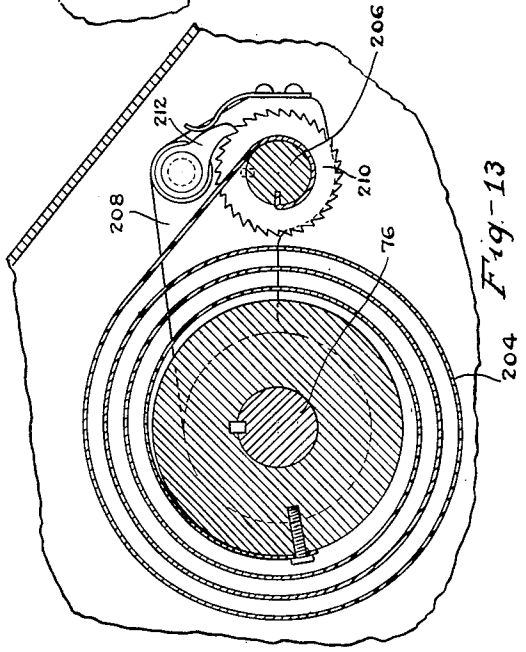


Fig. 13

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PRINTING MACHINE

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Fig. 15

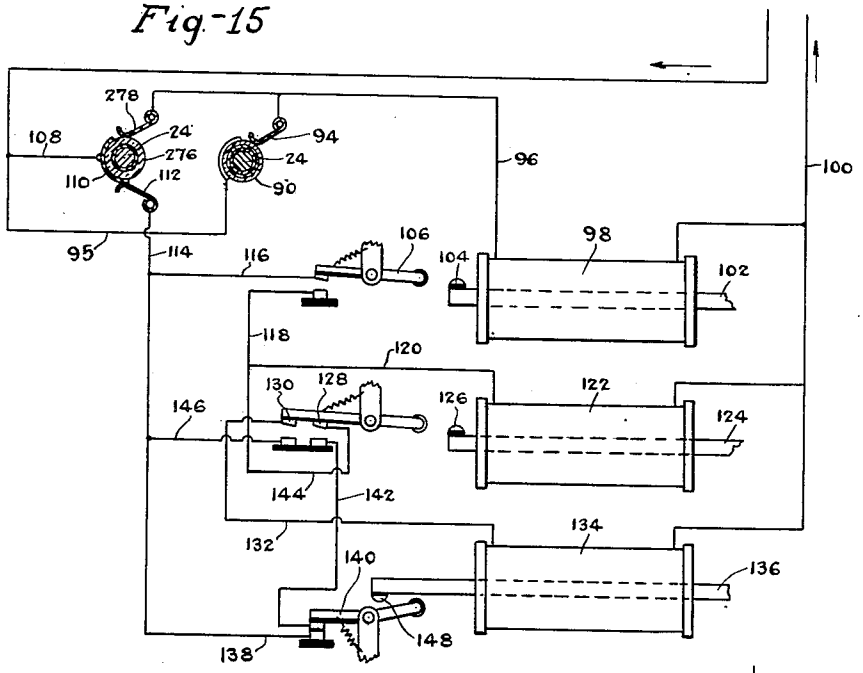
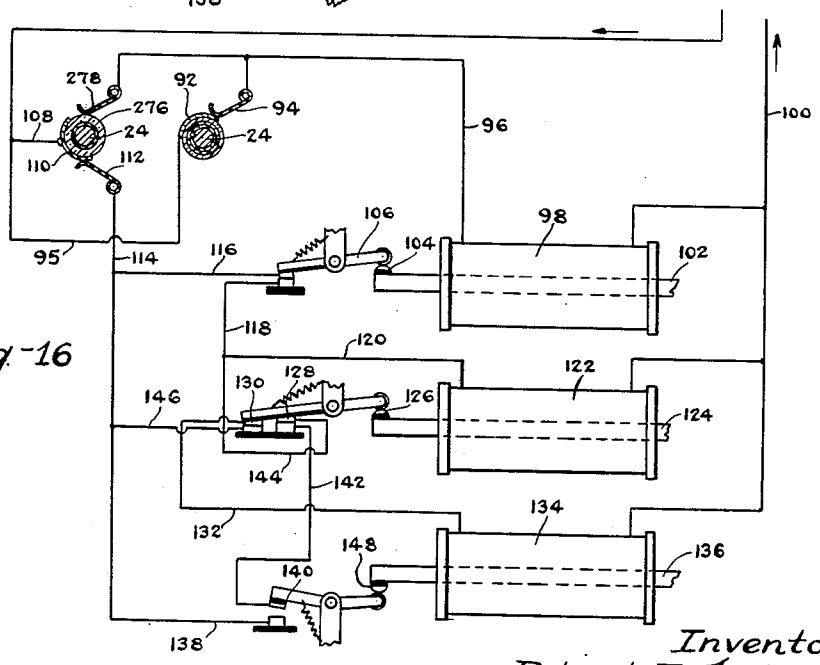


Fig. 16



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Patented Apr. 9, 1929. 1,708,750

UNITED STATES PATENT OFFICE

ROBERT J. ANDERSON, OF MINNEAPOLIS, MINNESOTA.

PRINTING MACHINE.

Application filed June 19, 1926. Serial No. 117,159.

My invention relates to printing machines, and more particularly to electrically operated printing machines. An object of this invention is to reduce the cost of equipment and the cost of production of printed matter by providing a simple and inexpensive mechanism for replacing the present complicated and expensive linotype, intertype and monotype machines which are heavy, cumbersome, slow of operation, and require skilled mechanics to keep in order for steady operation. The machine which constitutes this invention is simple in design and construction, rapid in its operation, and available for use by customary skilled typists without the necessity of providing special skilled mechanics to keep it in operation and repair. The machine and the process in which the machine is employed are designed to combine various steps now used singly, thus making one new and complete system for the production of printed matter having a wide field in the printing industry and especially adapted for the production of newspapers, the machine being capable of carrying a number of faces of type available for the ordinary news column matter with provision for larger faces of type so that headlines can be prepared on the same machine and consecutively in the production of a column of news matter with the display headlines. The process in which the machine is used is designed to eliminate several expensive steps, namely, cutting out the necessity of taking matrix impressions from the form and casting or stereotyping the same. In my system, the printing is done directly from plates which are etched as a part of the process. My system also cuts out two of the present steps of the ordinary etching process, namely, the printing and developing of the positive and negative plates for transfer to metallic plates since the copy printed by the machine on transparent paper or like material produces negatives for direct transfer to the plate. My system also eliminates from the printing industry a large amount of assembling and hand work, the plate when etched from the copy being set up and ready for the printing press, thereby eliminating the necessity of stereotyping equipment and the large supply of type metal necessary both in stereotyping and in casting letters and lines by the monotype and linotype machines. Such type metal deteriorates rapidly with use which results in imperfect type face.

It will be seen that in addition to the simplicity of my machine and its comparatively small cost for construction, that it will greatly reduce the cost of equipment and overhead expense involved in the present method. I am aware of the fact that in the past, printed matter has been prepared on the ordinary typewriter and transferred to metallic plates and etched, and then printed matter produced therefrom, notably in the case of the "Literary Digest" during the printers' strike some years ago. In my earlier efforts, I produced plates by this method and reached the conclusion that it was necessary to design a mechanism especially for this purpose in order to provide features necessary to make a practical and workable process for the following reasons,—with the ordinary typewriters in general use, there is no provision for spacing to obtain justification of the lines nor for the various faces of type required in practical newspaper production. The particular defect in attempting to do this work on typewriters using ribbons is the impossibility of making a sharp, clearcut outline of the type which defect allows the light in printing and transferring to pass through parts of the letter thus affecting the sensitizing material on the plate and resulting in imperfect work. Special provision is made in my machine for inking the type face as it passes over in contact with inking rollers, thus producing a clean-cut letter which is solid and opaque. Provision also is made in my machine to secure the proper pressure on the various faces of type thus preventing the cutting or perforation of the printed sheet which is used for the negative.

The full objects and advantages of my invention will appear in connection with the detailed description thereof, and the novel features of my inventive idea will be particularly pointed out in the claims.

In the accompanying drawings which illustrate one form in which my invention may be embodied,—

Fig. 1 is a side elevational view of the machine. Fig. 2 is a view illustrating differ-

ent sized letters which may be produced by the machine. Fig. 3 is a view in section on the line 3—3 of Fig. 9. Fig. 4 is a similar view showing the position of the parts after a key has been depressed. Fig. 5 is a plan view of a spring plate, the same being partly broken away to indicate that it may be made of any desired width. Fig. 6 is a view in central vertical section from front to back. Fig. 7 is a detail view in section on the line 7—7 of Fig. 12. Fig. 8 is a view on enlarged scale showing a portion of what is illustrated in Fig. 4 and with the hammer operated. Fig. 9 is a view in horizontal section on the line 9—9 of Fig. 4. Fig. 10 is a view in vertical section on the line 10—10 of Fig. 3. Fig. 11 is a view in vertical section on the line 11—11 of Fig. 3. Fig. 12 is a fragmentary front view as the parts appear on the line 12—12 of Fig. 3. Fig. 13 is a view in vertical section on the line 13—13 of Fig. 9. Fig. 14 is a view in vertical section on the line 14—14 of Fig. 9. Fig. 15 is a wiring diagram showing the neutral position. Fig. 16 is a wiring diagram showing the position of parts after the solenoids used in the machine have been operated.

As shown in the drawings, I provide a base 20 upon which is mounted a casing 22 enclosing the greater part of the mechanism. The sides of this casing near the front thereof support a rod or stationary shaft 24 upon which the keys of the machine are rotatably mounted. In the embodiment shown as will appear from Fig. 9, there are thirty-six of these keys arranged in three rows. The three keys at the left hand of the machine are designated respectively 26, 28, and 30 while the key at the right hand is designated 32. These four keys are for a special purpose which will be referred to later. The other thirty-two keys are used to determine the particular letters or characters which it is desired to print and hence are designated by the common reference character 34. The keys 34, when depressed, serve to select the particular letter or character and other mechanism is then operated to turn a printing drum 36 which has several circumferential rows of printing characters around its surface, there being thirty-two of these characters in each row to correspond respectively with the keys 34 as will be apparent from Figs. 6 and 8. Each of the keys 34 is provided with a downward extension 38 the lower portion of which is connected with the casing by a spring 39 so that the keys are normally held up in initial position. The extension 38 is provided with a slot 40 which is curved on a radius having a shaft 42 as the center. Secured to the shaft 42 are two arms 44, there being one of these arms near each end of the shaft as shown in Fig. 9. The arms 44 are connected by three bars 46, 48, and 50, the bar 46 being spaced above the bar 48 while the bar 50 is somewhat ahead of and lower than the bar 48. Slides 52 are connected to the extensions 38, there being one slide for each key. The connection is made by rivets 54 secured to the slides and positioned slidably in the slots 40. The slides have reduced rear ends 56 which are adapted to move back between the bars 46 and 48 when the keys are depressed. The slides 52 which are associated with the keys 34 are normally maintained upwardly in horizontal position by means of hooks 58 on their upper edges, these hooks in the forward position of the slides engaging over a rod 60 extending between the sides of the casing. When any one of the keys 34 is depressed, the slide associated therewith is moved rearwardly, thereby releasing the hook 58 so that the slide is capable of having a downward movement to the extent shown in Fig. 4 upon energization of a solenoid which will be referred to later. The slides 52 are provided with slots which slidably receive two rivets 62 and 64 attached to hooked arms 66, these arms being progressively longer as they proceed from one side of the machine to the other, and it being understood that there is one of these arms for each of the keys 34. Loosely mounted on the shaft 42 are two arms 68 the projecting arms of which are connected by a rod 70. Also loosely mounted on the shaft 42 and rigidly secured to one of the arms 68 by a set screw 71 as shown in Fig. 9, is a segment whose outer margin constitutes a curved rack 72 provided with internal teeth and having the shaft 42 as the center of rotation. The teeth of the rack 72 are engaged by the teeth of a gear 74 mounted on a shaft 76 which is the shaft upon which the printing drum 36 previously referred to is secured. The teeth of the gear 74 are normally engaged by a limited number of teeth formed on a mutilated gear 78 secured to a shaft 80 to which is also secured a smaller gear 82 which meshes with a gear 84 which in turn meshes with a larger gear 86, the teeth of which are engaged by a segmental rack 88 secured to and having the shaft 42 as a center. The purpose of the rack 88 and the associated gearing will be apparent later. It is obvious that in order to print different ones of the characters arranged in a circumferential row on the printing drum that this drum has to be given rotative movements of different extent. This result is brought about by the use of the hook arms 66 of varying lengths in connection with mechanism now to be described. After the desired character key 34 has been depressed in order to engage its associated slide 52 with the bars 46 and 48, the operator depresses the key 26 which is at the extreme left of the key-board. This

key is secured to a sleeve 90 of insulating material rotatable on the rod 24 and having an arcuate metallic contact member 92 carried thereby and it will be understood from Figs. 15 and 16 that the depression of the key 26 rotates the sleeve 90 and brings the contact member 92 into engagement with a contact finger 94 so that current flows from a leading-in wire 95 through the contact member 92 and the finger 94 to a wire 96 which is coiled around a solenoid 98 and then connected to a leading-out wire 100. The energization of the solenoid 98 draws in its core 102 which actuates a rack to be described later and which causes the spacing. The extended end of the core 102 carries an insulated button 104 which when the core is actuated engages a switch 106 and closes the same, thereby causing current to flow through the branch wire 108, a contact member 110, a spring finger 112, a wire 114, a wire 116, the switch 106, a wire 118 and a wire 120 which is coiled around a second solenoid 122 and then connected to the leading out wire 100. The energization of the solenoid 122 draws in its core 124 which causes the turning movement of the printing drum 36 in a manner to be described later. The extended end of the core 124 carries an insulated button 126 which when the core is actuated engages a switch having two contacts 128 and 130 and closes the same, thereby causing current to flow from the wire 118, through a wire 132 which is coiled around a third solenoid 134 having a core 136, this wire being connected to the leading-out wire 100. However, if the key 26 be released, the circuit through the solenoid 98 will be broken and its core 102 will be released but current will flow from the wire 114 through a wire 138, a normally closed switch 140, a wire 142, the contact 128 and a wire 144, to the wire 120 so as to energize the solenoid 122. Current will also flow through a wire 146, contact 130 and wire 132 so as to energize the solenoid 134. When the core 136 of this latter solenoid is drawn in toward the right, a printing hammer to be described later is operated. The extended end of the core 136 carries an insulated button 148 which when the core is actuated engages the normally closed switch 140 and opens the same, thereby causing the current to be cut off from the solenoids 122 and 134 so that their cores return to original position. The sheet of material upon which the printing is performed is designated by the letter S, and this material is inserted in the machine in the form of a roll R placed in a container 150, the roll of material being slid into the container from the side. The free end of the sheet material is drawn upwardly over a guide 152 and over a spring plate 154 secured at its upper end to a bracket 156 attached to the casing. As shown in Fig. 5, the free end portion of the plate 154 is provided with a plurality of fingers 158 corresponding in number to the number of circumferential rows of characters on the printing drum 36 and these fingers are provided with perforations 160 for exposing the characters which are to be printed. The sheet S after passing over the spring plate 154 is passed between rollers 162 and 164 rotatably mounted on a carriage 166 provided with rollers 168 running on tracks 170 carried by the casing. The carriage 166 is provided with a rack 172 which is engaged by a pinion 174 pinned to a ratchet wheel 176 so as to rotate therewith upon a shaft 177 carried by the casing. As best shown in Fig. 10, an arm 178 is adapted to rock on the shaft 177. The lower end of the arm 178 is pivotally attached to the core 102 of the solenoid 98. A spring-pressed pawl 180 is pivotally attached to the upper end of the arm 178 and engages the teeth of the ratchet wheel 176. When the solenoid is energized in the manner previously described, the core 102 is moved toward the left as viewed in Fig. 10, thereby swinging the arm 178 and by means of the pawl 180 causing the pinion 174 to move the carriage one space, this space being accurately determined by a stop 182 carried by the core 102 which moves into engagement with a stop 184 carried by the casing. When the solenoid is de-energized, a spring 186 coiled around the core moves the latter back to original position and the pawl 180 slips over the ratchet wheel so as to be in position for moving the carriage another space toward the left. It will be understood that the sheet upon which the printing is performed is firmly held between the two rollers 162 and 164 and that when these rollers are turned in a manner which will be described later, the sheet is advanced for a new line. When the sheet is advanced, the forward end thereof engages a curved guide 188 attached to the carriage. The carriage is made in two parts hinged together by a rod 190 so that the front portion carrying the rollers 162 and 164 may be lifted. A forwardly extending arm 191 is attached to the rod 190 and at the free end of this arm a finger 192 extends down in front of a plate 194 secured to the casing. The plate 194 is provided with a number of rows of graduations 196 as shown in Fig. 12 which corresponds to the different spacing required by the different sized characters on the printing drum. The manner in which the printing drum 36 is rotated to bring the desired character into printing position will now be described. When the solenoid 122 is energized in the manner previously described, its core 124 is moved from the position shown in Fig. 3 into that shown in Fig. 4. The left hand end of the core has an enlargement 198 to which is pivoted one

end of an arm 200, the other end of which is secured to the shaft 42 which carries the arms 44. The turning movement imparted to the shaft 42 by the arm 200 causes the bars 46 and 48 to move downwardly carrying therewith the particular slide 52 which was moved rearwardly by the selected key. The particular hooked arm 66 attached to this slide is also carried downwardly and its hooked end engages the rod 70 and causes the arms 68 and the segmental rack 72 to turn, thereby rotating the shaft 76 and the printing drum 36 secured thereto. Since the hooked arms 66 are all of different lengths, the printing drum will be moved the proper distance to bring the selected character into proper printing position. After the printing of the selected character has been performed, the solenoid 122 is de-energized and its core 124 is returned to original position by a spring 202. The purpose of the mutilated gear 78 will now be understood. The rack 88 is always moved the same distance for different characters and this distance is such as to cause one rotation of the mutilated gear. Therefore, when the selected character has been brought into proper printing position, the teeth of the mutilated gear come around into engagement with the gear 74 which is secured to the shaft of the printing drum and prevent momentum from carrying the printing drum beyond its proper position. The shaft 76 is returned to original position by a coiled spring 204 which, as best shown in Fig. 13, is secured at one end to the shaft 76 and at its other end is secured to a short shaft 206 rotatably carried by an arm 208 shown more fully in Fig. 9. In order that tension of the spring may be adjusted, a ratchet wheel 210 is secured to the shaft 206 and this ratchet wheel is engaged by a spring-pressed pawl 212. The manner in which the selected character is printed on the sheet material by energization of the solenoid 134 will now be described. The upper end of its core 136 has an enlargement 214 to which the outer end of an arm 216 is pivotally attached. The inner end of this arm surrounds a shaft 218 and has a key which fits into a key-way 220 made in the shaft so that the latter may be slid in a long bearing 222 in which it is mounted as will be apparent from Figs. 9 and 10. Secured to the shaft 218 is an arm 224 whose end is reduced and adapted to fit into slots made in hammer-arms 226 which correspond in number to the number of rows of characters around the printing drum 36. The hammer-arms 226 are made in two parts adjustably secured together as best shown in Fig. 8 and the portions engaged by the arm 224 are pivotally mounted on a rod 228 and are connected to rearwardly extending arm 230 which are normally held in engagement with stops 232 by springs 234, the tension of which may be adjusted by a screw bolt 236. When the solenoid core 136 is drawn upwardly by the energization of the solenoid, the action of the solenoid is partly off-set by the tension of the springs 234 so that the force of the blow exerted by the particular hammer arm in use may be regulated in order to prevent cutting into the paper by the type characters. The upper ends of the hammer arms 226 are provided with striking pads 238 which may be secured in the manner best shown in Fig. 8. It will be understood that when the pad strikes the paper, the corresponding spring finger 158 is depressed and the type character projects through the perforation 160 in the spring finger so that the type character is impressed upon the paper. As previously explained, the arm 224 may be made to cooperate with any one of the hammer-arms 226. The manner in which this is done will now be described especially with reference to Fig. 10 in which it will be seen that the shaft 218 at its inner end has a swiveled connection 240 by means of which it is attached to a rod 242 in such manner that this shaft may be slid by sliding the rod and yet may rotate with relation to the rod. The rod 242 passes slidably through a support 244 and at its outer end carries a pin 246 adapted to engage any one of a number of holes 248 in a plate 250. It will be understood that the holes 248 correspond to different positions of the arm 216 and that, therefore, the desired size of type characters which will be printed is determined by the relative position of the pin 246 and the holes in which it is placed. Instead of employing an inking ribbon as is customary in typewriters, the type characters are inked by the following mechanism. An ink receptacle 252 is supported on a post 254 as shown in Figs. 6 and 8 and this receptacle is provided with a tube 256 which prevents the retention of more than the proper quantity of ink in the receptacle. A roller 258 dips below the surface of the ink and this roller is in frictional engagement with a roller 260 which in turn is in frictional engagement with a roller 262. The ink taken up by the lower roller 258 is communicated to the middle roller 260 and then to the upper roller 262 which is engaged by the type characters on the printing drum during rotative movements of the latter. A gear 264 secured to shaft 76 engages a gear 266 secured to the shaft of the roller 262. The gear 266 engages a gear 268 secured to the shaft of the roller 260 while the gear 266 engages a gear 270 secured to the shaft of the roller 258. The rollers are thus positively rotated and the ink is uniformly spread for application to the type characters. As will be understood from Fig. 14, the shafts of the three rollers just referred to

are mounted in eccentric bearings 272 held in adjusted position by set screws 274 whereby the engagement of the rollers with each other may be regulated. Referring again to the wiring diagrams shown in Figs. 15 and 16 and also to Fig. 9, it will be understood that the key 28 is secured to an insulated sleeve 276 rotatable on the rod 24 and that this sleeve is normally in contact with the finger 112 previously referred to. Upon depressing the key 28, the arcuate contact member 110 carried by the sleeve 276 is moved into contact with a contact finger 278 so that a circuit is completed through the coil of the solenoid 98 without completing a circuit through any of the other solenoids. Also as previously explained, the energization of the solenoid 98 moves the rack and the carriage to which it is attached one space. By successively depressing the key 28, the carriage may be moved any desired number of spaces. The key 30 is attached to an arm 280 while one end of a wire 282 is attached to this arm, the other end of the wire being attached to an arm of the pawl 180 as best shown in Figs. 10 and 11. When this key 30 is depressed, the pawl 180 is released from the ratchet wheel 176 which permits the carriage to be moved into initial position for a new line. In order to thus move the carriage, a lever 284 pivotally attached thereto may be employed for pushing the carriage. This lever has a pawl 286 attached thereto which engages a ratchet wheel 288 carried by the upper roller 162. Therefore, upon depressing the lever 284, the paper is advanced for printing a new line. The roller 162 also carries a knob 290 at its end by means of which this roller may be independently advanced. It has been previously explained that upon sliding the rod 242, the arm 224 secured to the shaft 218 will be moved so that it may be made to engage with any one of the hammer-arms whereby type characters of different sizes will be printed. It is obvious that when this is done, the spacing produced by the movements of the carriage must be changed to provide for the different sized characters. This result is brought about by mechanism now to be described. By referring to Fig. 10, it will be seen that the solenoid core 102 has an inner end 292 which engages the end 294 of a screw 296 when the solenoid core is returned by the coiled spring 186, previously referred to, and that the position of the screw end 294 determines the amount of spacing. It is to be understood that the stop 182 carried by the solenoid core 102 is adapted to slide in a slot in the casing 22, this slot not appearing in Fig. 10. The screw 296 has a head 300 which, as shown in Fig. 1, has a number of notches 302 around its periphery, any one of which may be engaged with a tooth 304 carried by a plate 306 extending out from the casing. In the particular embodiment of my invention herein disclosed, it is contemplated that all of the letters will be upper case or capital letters but it is to be understood that if desired, both upper case and lower case letters may be provided for. As shown in Fig. 9, there are twelve rows of characters around the printing drum, these rows being designated by the numeral 308 as indicated in Fig. 9. It is further contemplated that the characters in the alternate rows will be alike except for size and that half of the rows will contain the twenty-six letters of the alphabet, the other six characters in these rows being the more commonly used punctuation marks. The other half of the rows considered alternately will include numbers, fractions and other marks such as the less commonly used punctuation marks. The arrangement described is an example of one of the proposed arrangements and it will be understood that other arrangements of the characters may be employed. It is intended that there will be two characters indicated on each of the keys 34 corresponding to like characters in the two different rows of characters on the printing drum. It is to be understood that when figures and fractions and the less commonly used marks are to be printed on the paper, the arm 224 will be moved from engagement with one of the hammer-arms 226 into engagement with the adjacent hammer arm and then moved back again after the uncommon character has been printed. When the letters employed are all upper case letters according to the arrangement previously described, the sentences may be commenced with the desired letter but of the next larger size. Fig. 2 is an illustration of the idea of starting the sentence in this manner. When it is desired to accomplish this result, it will be understood that since the larger size letter occupies more space than the smaller letters of the sentence, provision must be made for obtaining more space on the paper to take care of this larger letter. This may be done by the following construction. The graduated plate 194 previously referred to as being carried by the casing is attached to a square rod 310 which is supported at its ends by standards 312 extending up from the casing. The square rod 310 carries adjustable stops 313 which determine the travel of the carriage in both directions. Mounted on the square rod 310 is a slide 314 which has end portions 316 and 318 between which the slide is partly cut away. The arm 191 carrying the indicating finger 192 extends through this cutaway space so that the arm may engage either of the end members of the slide, the distance between which is the same as the distance between the rows of characters on the printing drum. The end

member 318 is split as shown in Fig. 7 and a screw 320 passes through the split portion, a handle member *h* being threaded on the screw 320 so that the split portions may be drawn together to clamp the slide on the rod 310 whenever desired, it being understood that ordinarily this handle is sufficiently loose on the screw so that the slide may move freely on the rod 310. When it is desired to print a larger letter to start a sentence, the pawl 180 is released so that the carriage may be freely moved and the arm 191 brought into engagement with an end member of the slide 314 which has now been clamped in proper position as determined by the scale so that the letter may be printed at the proper place on the paper to produce uniform spacing. It is apparent that by moving the arm 191 into engagement with the other end member of the slide 314, it is possible to introduce a smaller letter into the printing if desired. In order to explain a further capability of operation of the machine, it is desirable to describe how a negative may be prepared in which the lines of printing are justified so that they will all terminate in the same vertical line at the right. In making the first copy on the machine, the place where it is desired to have the final lines terminate is determined and the operator notes how many spaces are left unfilled when the last word or syllable of a word is printed in each of the lines. The operator then rewrites the copy and divides up the number of unfilled spaces for each line between the words of the line, thus causing all of the lines to terminate at the same distance from the right hand edge of the paper. The special key 32 shown in Fig. 9 near the lower left corner is a reserve key and may be connected up for any desired purpose.

I claim:

1. In a printing machine, the combination of a special key, a plurality of character keys, a carriage for the sheet to be printed, a printing drum having type characters on its surface, means operated by said character keys for selecting any one of said characters, and electromagnetic devices set in operation by movement of said special key for causing said carriage to move one space and for turning said drum into position for printing the selected character.

2. In a printing machine, the combination of a special key, a plurality of character keys, a carriage for the sheet to be printed, a printing drum having type characters on its surface, means operated by said character keys for selecting any one of said characters, a striker adapted to cooperate with the selected character, and electromagnetic devices set in operation by movement of said special key for causing said carriage to move one space and for turning said drum into position for printing the selected character and for operating said striker.

3. In a printing machine, the combination of two special keys, a plurality of character keys, a carriage for the sheet to be printed, a printing drum having type characters on its surface, means operated by said character keys for selecting any one of said characters, a striker adapted to cooperate with the selected character, three electromagnetic devices set in operation by one of said special keys, connections between one of said devices and said carriage for moving the latter one space, connections between another of said devices and said printing drum for turning the latter into position for printing the selected character, connections between the other of said devices and said striker for operating the latter, and connections between one of said devices and said carriage set in operation by the other of said special keys for causing said carriage to move independently one space at a time.

4. In a printing machine, the combination of three special keys, a plurality of character keys, a carriage for the sheet to be printed, a printing drum having type characters on its surface, means operated by said character keys for selecting any one of said characters, a striker adapted to cooperate with the selected character, three electromagnetic devices set in operation by one of said special keys, connections between one of said devices and said carriage for moving the latter one space, connections between another of said devices and said printing drum for turning the latter into position for printing the selected character, connections between the other of said devices and said striker for operating the latter, connections between one of said devices and said carriage set in operation by another of said special keys for causing said carriage to move independently one space at a time, and connections between the other of said special keys and said carriage for releasing the latter.

5. In a printing machine, the combination of a carriage for the sheet to be printed, electrically operated means for moving said carriage one space at a time, a printing drum having type characters on its surface, electrically operated means for turning said drum into position for printing the characters as desired, rollers mounted on said carriage and between which said sheet passes, and spring fingers mounted between said drum and said rollers, said fingers being provided with perforations for exposing said characters.

6. In a printing machine, the combination of a carriage for the sheet to be printed,

mechanism for moving said carriage one space at a time, a printing drum having type characters on its surface, mechanism for turning said drum into the position for printing the characters as desired, rollers mounted on said carriage and between which said sheet passes, and spring fingers mounted between said drum and said rollers, said fingers being provided with perforations for exposing said characters.

In testimony whereof I hereunto affix my signature.

ROBERT J. ANDERSON.