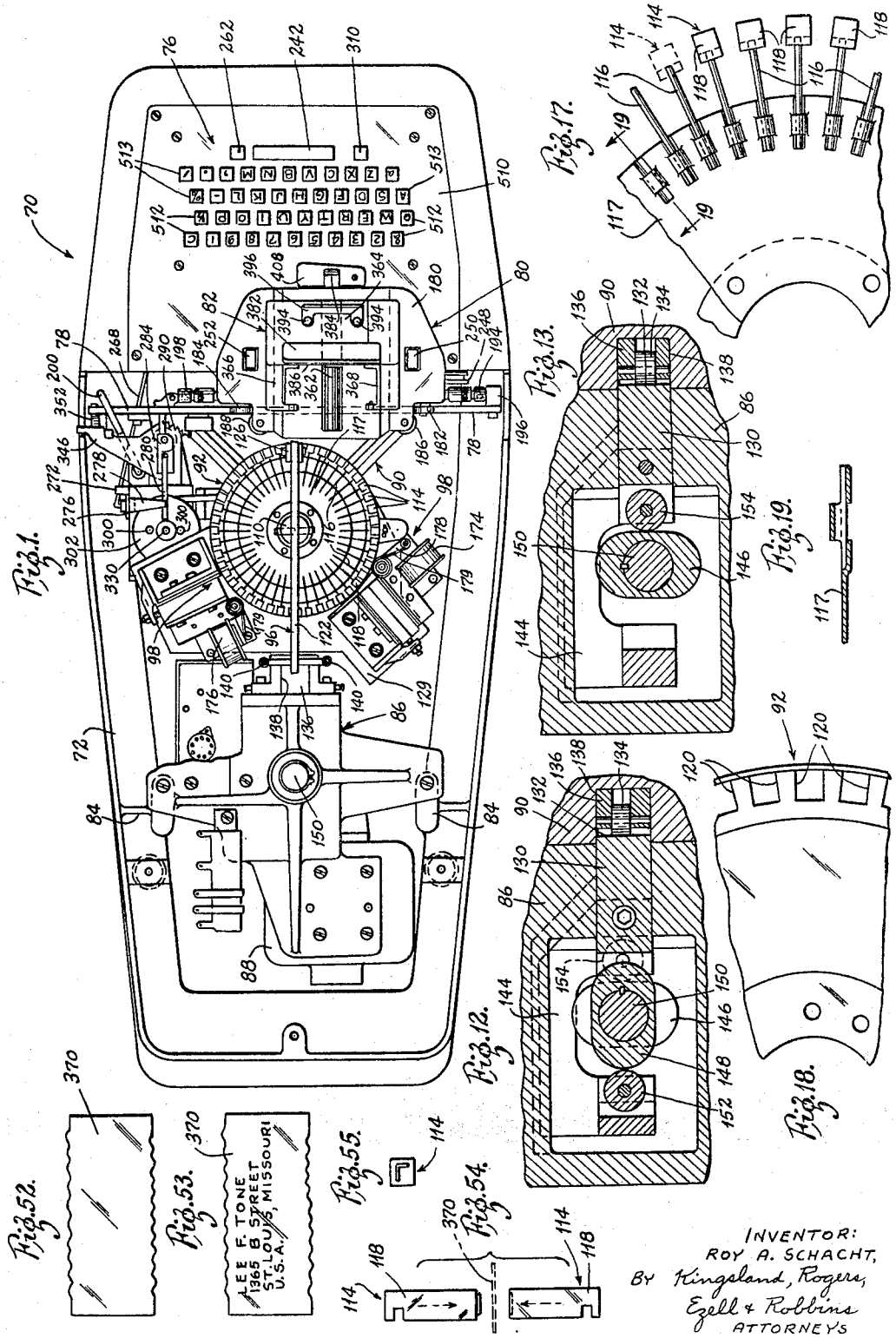
Aug. 2, 1966 R. A. SCHACHT 3,263,789

MARKING MACHINE WITH CHARACTER WHEELS ROTATABLE ABOUT A STATIONARY MEMBER

Original Filed Sept. 17, 1962 8 Sheets-Sheet 1

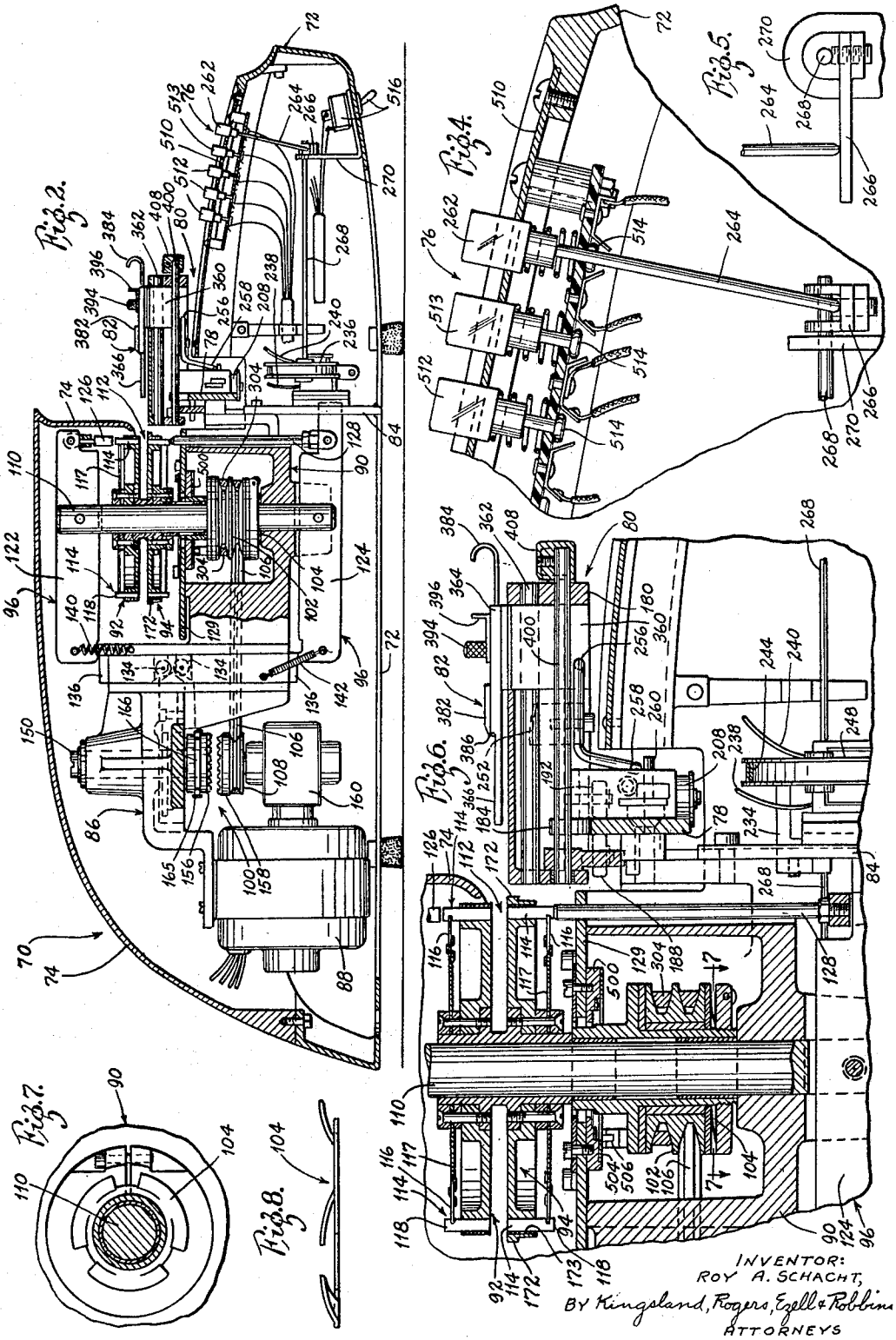


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MARKING MACHINE WITH CHARACTER WHEELS ROTATABLE ABOUT A STATIONARY MEMBER

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MARKING MACHINE WITH CHARACTER WHEELS ROTATABLE ABOUT A STATIONARY MEMBER

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Fig. 3.

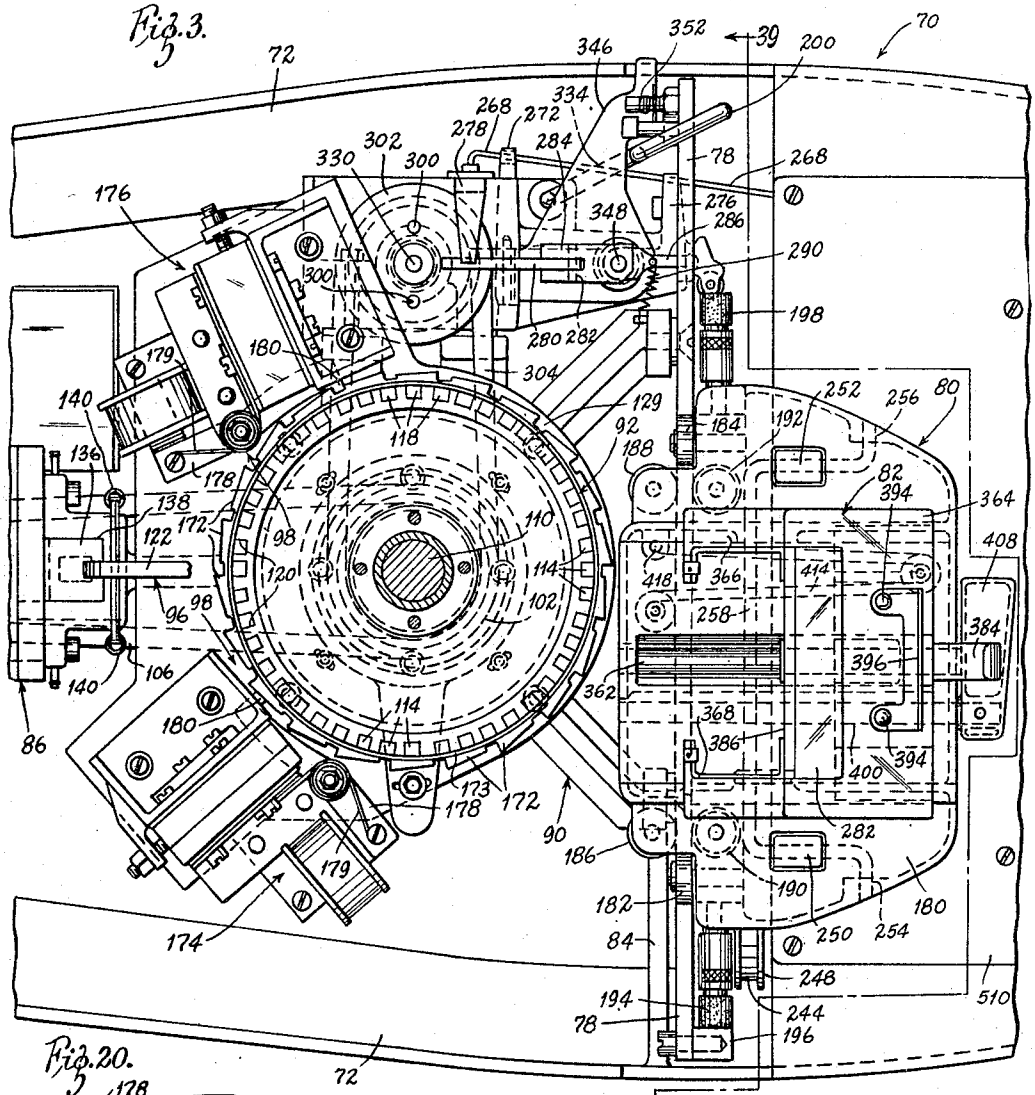


Fig. 20.

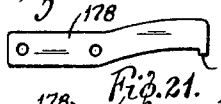


Fig. 21.

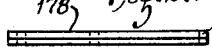


Fig. 22.



Fig. 23.

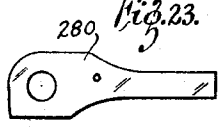


Fig. 24.

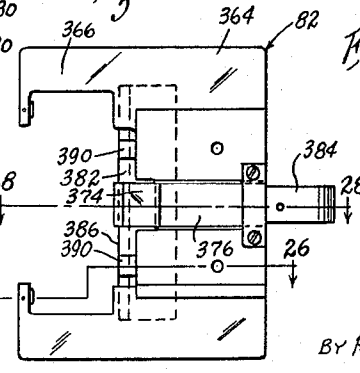
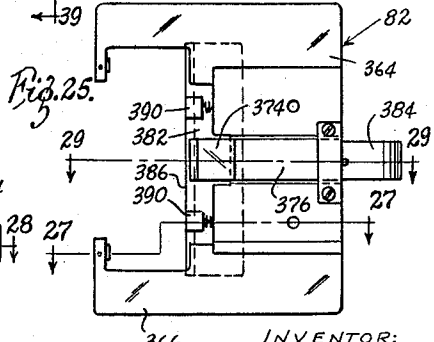


Fig. 25.



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Fig. 9.

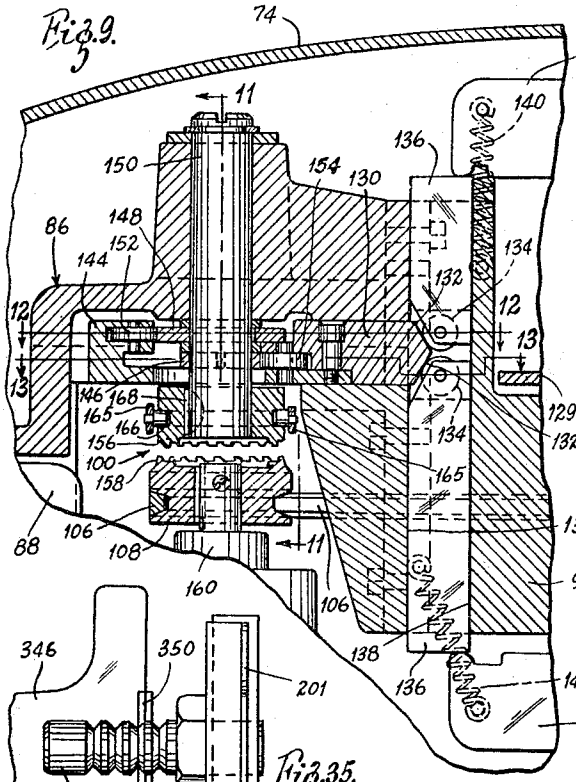


Fig. 10.

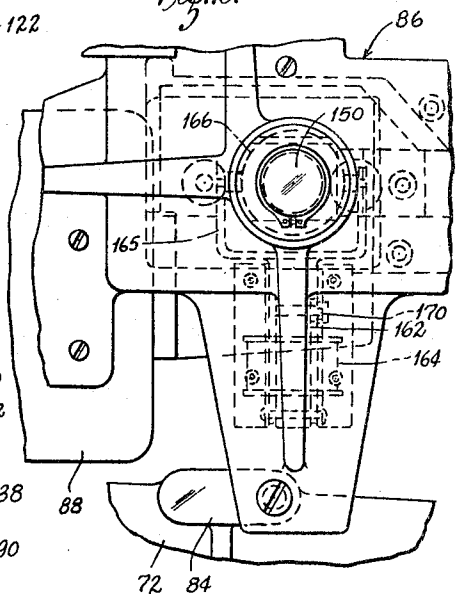


Fig. 35.

Fig. 33.

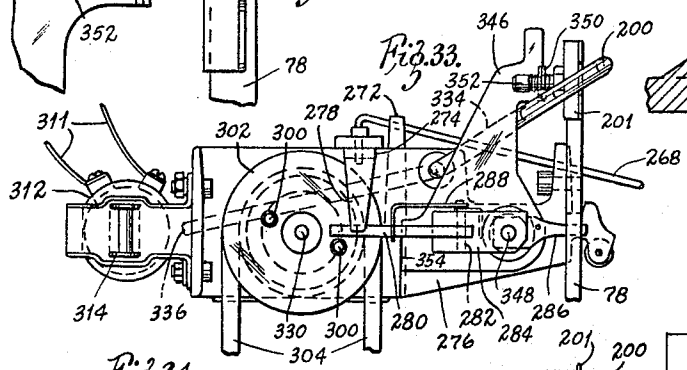


Fig. 11.

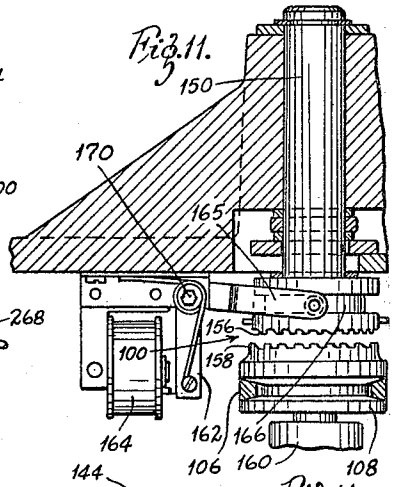


Fig. 34.

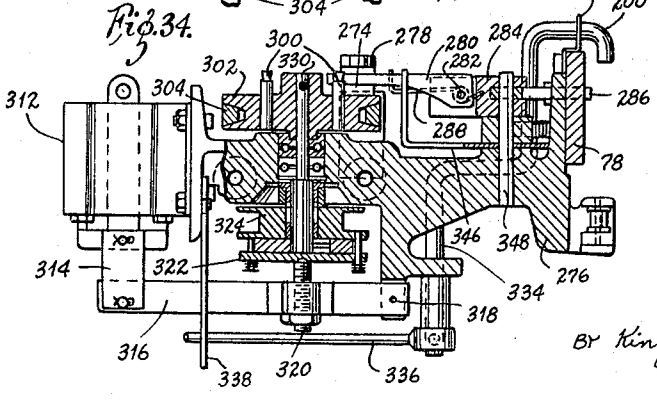


Fig. 14.

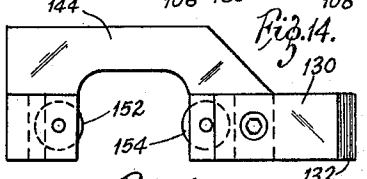
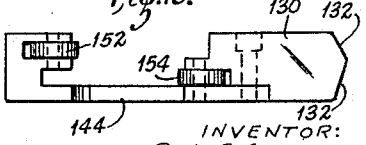


Fig. 15.



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Fig. 40.

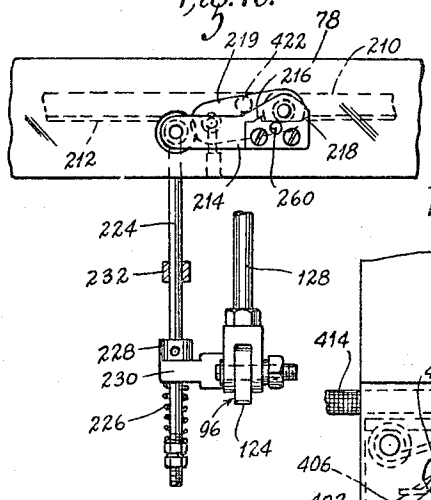


Fig. 41.

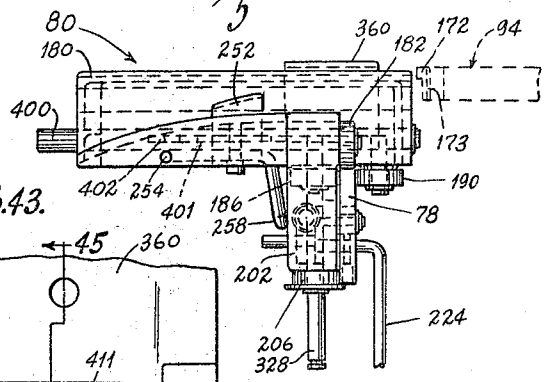


Fig. 43.

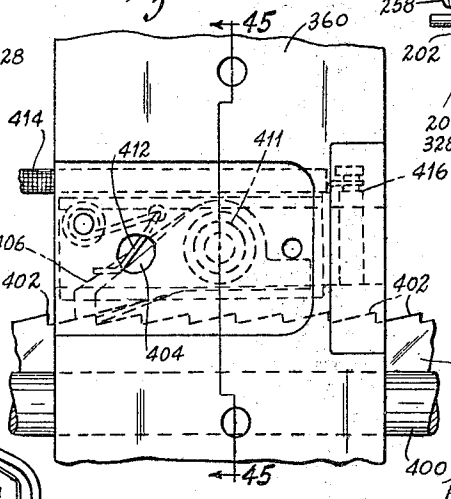


Fig. 16.

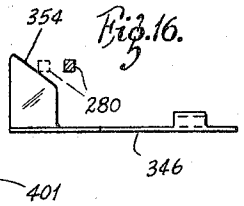


Fig. 42.

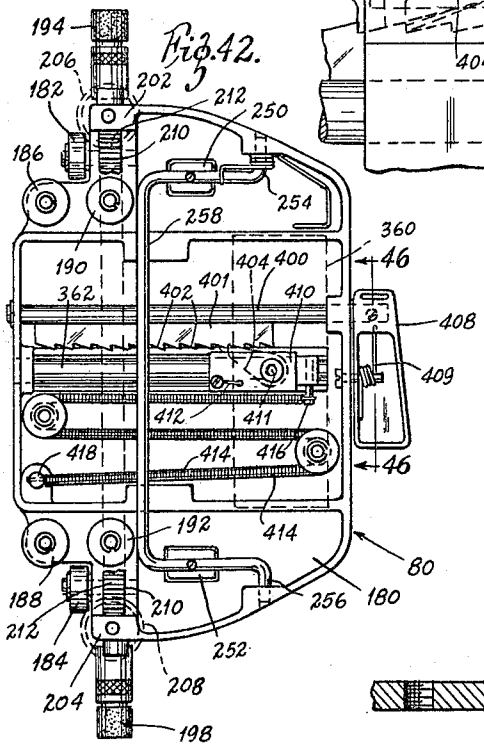


Fig. 44.

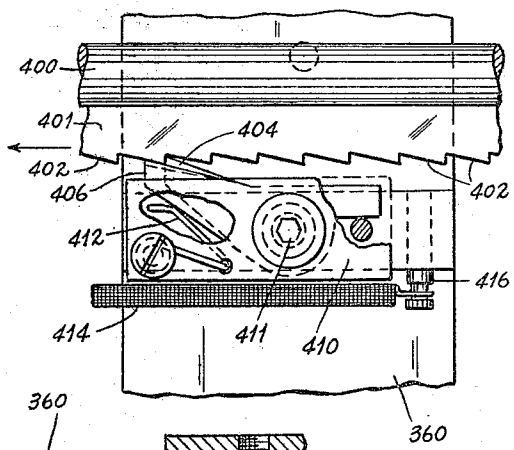


Fig. 46.

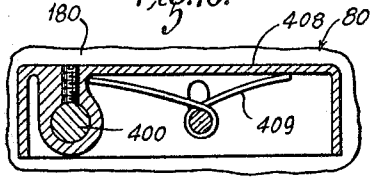
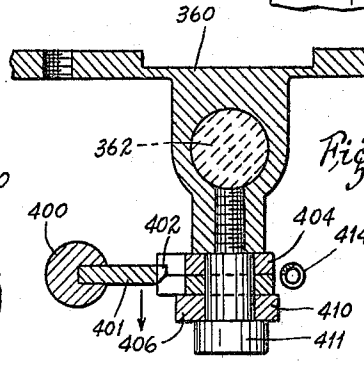


Fig. 45.



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Fig. 36.

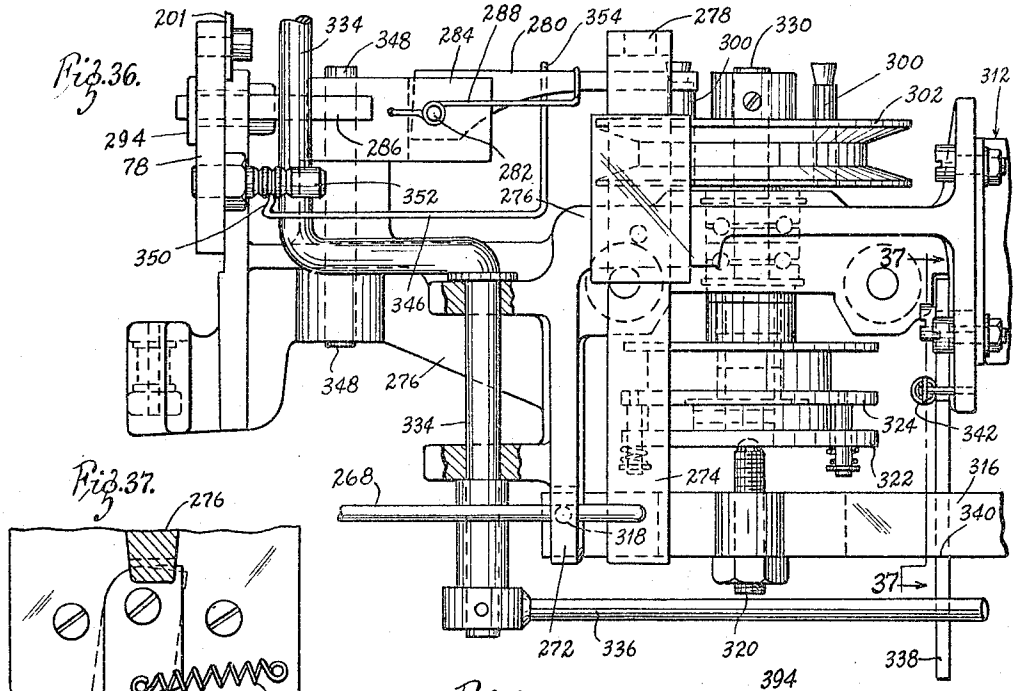


Fig. 37.

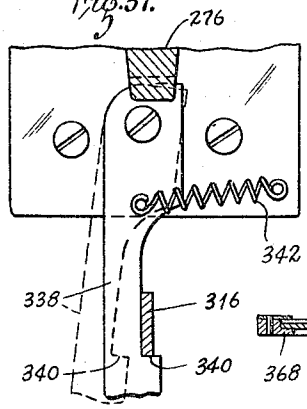


Fig. 26.

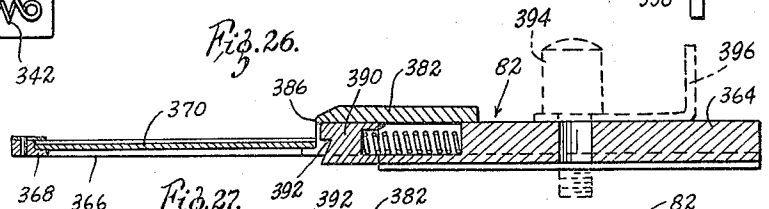


Fig. 27.

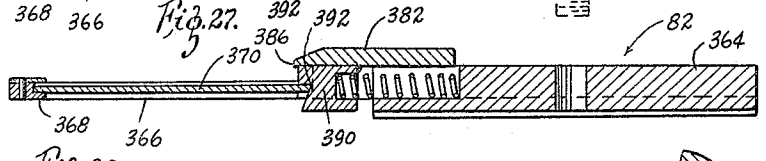


Fig. 28.

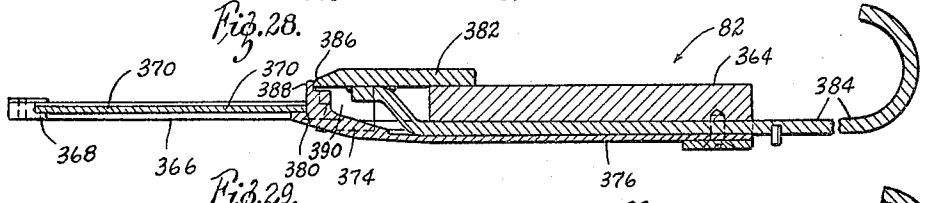


Fig. 29.

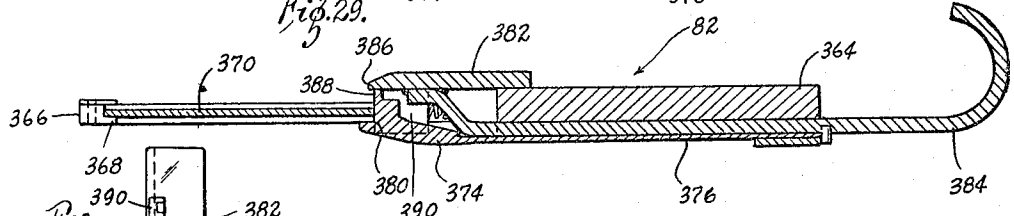
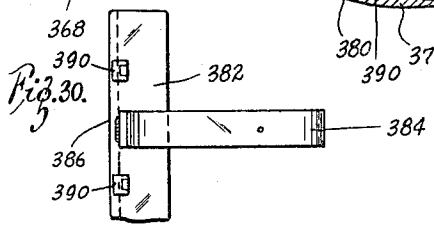


Fig. 30.



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MARKING MACHINE WITH CHARACTER WHEELS ROTATABLE ABOUT A STATIONARY MEMBER

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Fig. 38.

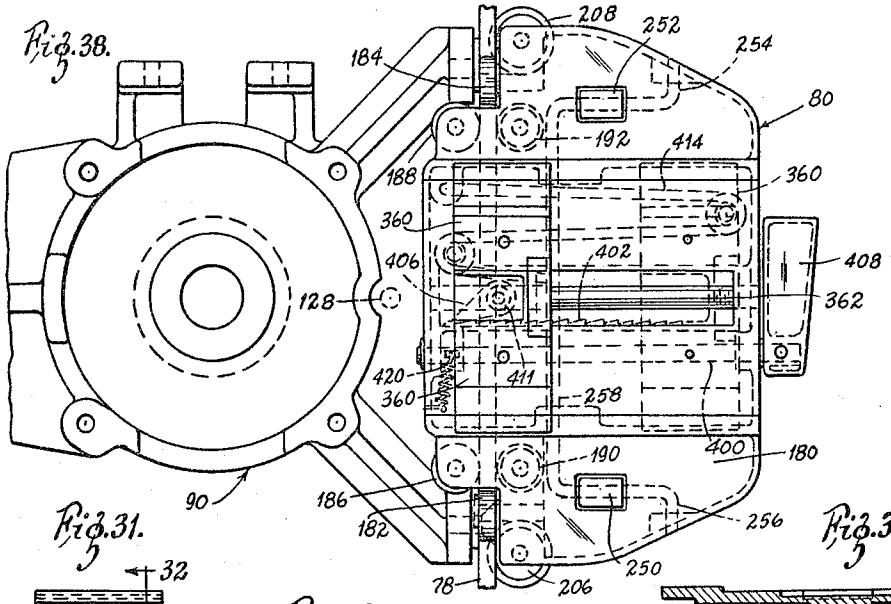


Fig. 31.

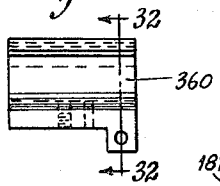


Fig. 32.

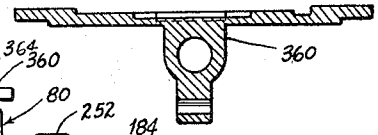


Fig. 39.

Fig. 47.

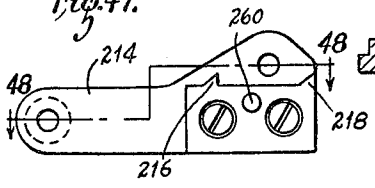


Fig. 49.

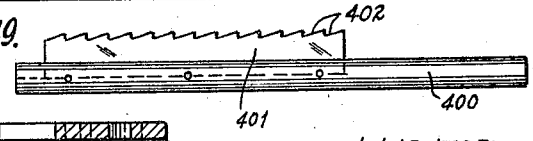
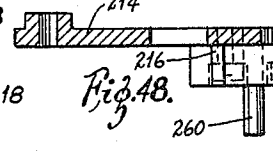


Fig. 48.



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Fig. 50.

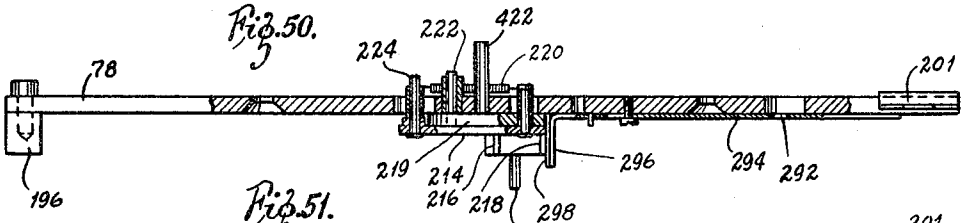


Fig. 51.

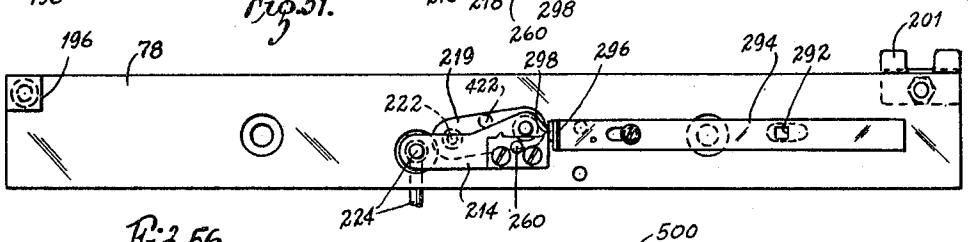
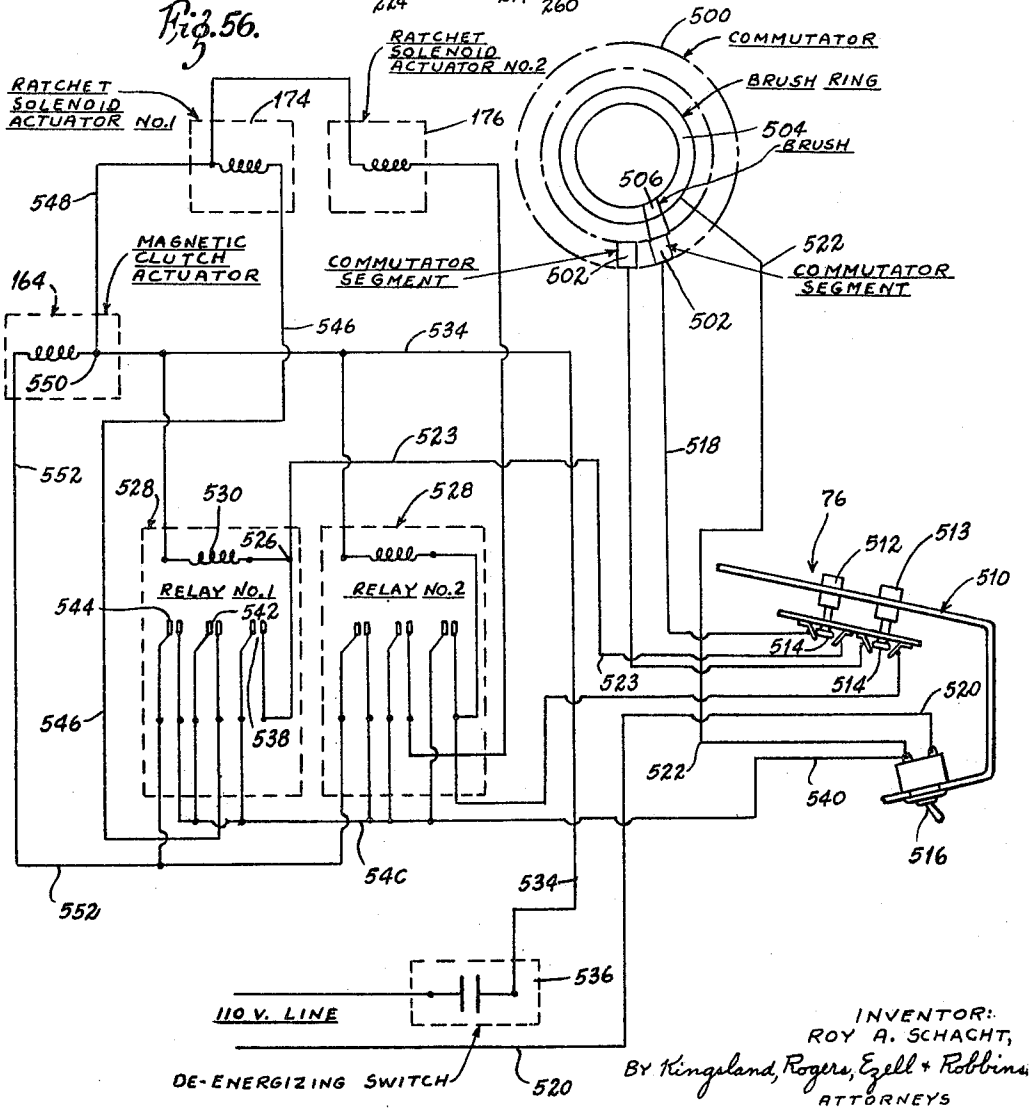


Fig. 56.



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United States Patent Office 3,263,789 Patented August 2, 1966

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MARKING MACHINE WITH CHARACTER WHEELS ROTATABLE ABOUT A STATIONARY MEMBER

Roy A. Schacht, 744 Des Peres Road, Kirkwood, Mo.

Original application Sept. 17, 1962, Ser. No. 224,605, now Patent No. 3,236,352, dated Feb. 22, 1966. Divided and this application July 8, 1964, Ser. No. 381,093

7 Claims. (Cl. 197—6.6)

This invention relates to improvements in automatic marking machines and in particular is concerned with a marking machine that has the characteristics of a typewriter that can write on sheet metal and like surfaces. This application is a division of copending application Serial No. 224,605, filed September 17, 1962, now Patent No. 3,236,352.

By means of this invention there has been provided an automatic marking machine having the characteristics of a typewriter with a standard keyboard, carriage rail, and carriage frame with a workpiece or tag holder which can be moved vertically with respect to the frame in the manner of the typing of a standard letter upon a typewriter. The machine is quite rugged, which is required for such marking machines, as they must mark upon sheet metal which requires a high degree of force in the typing operation.

It is a feature of this invention that a character wheel is employed having punch and die elements upon its periphery which correspond to the individual letter characters that are to be typed. The punch and die elements are located upon an integral upper and lower wheel with the tag adapted to be inserted therebetween. The wheel serves actually as a holder or guide and a separate operating mechanism is employed to move the punch and die character elements vertically through the wheels and into typing or marking contact with the tag. Control means are provided to stop the wheel in a selected position when a particular typewriter key is punched, and, through the structure of the machine, a high speed and operation efficiency have been provided.

The automatic marking machine has all of the characteristics of a typewriter, including a backspacing mechanism, a spacebar mechanism, a carriage return, and vertical feed adjustment for advancing the tag line by line into the typing mechanism. It is a significant advantage in the machine that the tag being typed upon is handled in much the same fashion as in a standard typewriter in that it is always kept at the same level in the machine, but may be moved horizontally, that is to say transversely across the machine and vertically, that is to say from the front to the rear of the machine in a horizontal plane during the entire typing operation. It will be understood that various flat objects having a substantial thickness may be typed whether they be sheet metal, plastic, or the like, and, as a result of the typing, these characters formed by the punch and die character elements are formed upon the tag, either of an embossed or debossed characteristic, so that a wide range of adaptability is provided. The characters may also be made to indent upon a tag by making one of the character heads in the form of a die while the opposite character element has a flat head or the characters may be formed to stencil by cutting out a character from the tag. These embodiments are forms of marking that may be employed just as other marking forms may be used, as will be well understood in the art.

The machine is quite rugged in its construction and yet is relatively simple in its design and can be operated by relatively unskilled workmen, which is of decided advantage in this field.

The above features are objects of this invention and

further objects will appear in the detailed description which follows and will be otherwise apparent to those skilled in the art.

For the purpose of illustration of this invention, there is shown in the accompanying drawings a preferred embodiment thereof. It is to be understood, however, that these drawings are for the purpose of illustration only and that the invention is not limited thereto.

In the drawings:

FIGURE 1 is a top plan view of the machine with the cover removed;

FIGURE 2 is a view in vertical cross section and partially in elevation taken substantially through the longitudinal axis of the machine;

FIGURE 3 is an enlarged fragmentary plan view of the middle portion of the machine showing the character wheel and the carriage casting;

FIGURE 4 is an enlarged vertical sectional view showing the key board elements and mounting;

FIGURE 5 is a view in front elevation of the backspacer linkage shown in FIGURE 4;

FIGURE 6 is a fragmentary view in vertical section taken along the longitudinal axis of the machine showing the character wheel structure and the carriage casting mounting;

FIGURE 7 is a view in section taken on line **7—7** of FIGURE 6 showing the friction spring clutch;

FIGURE 8 is an enlarged view in elevation of the friction spring clutch;

FIGURE 9 is an enlarged view in vertical section taken at the rear of the machine and showing the magnetic clutch and housing in disengaged position;

FIGURE 10 is a top plan view with the cover removed of the clutch and cam housing shown in FIGURE 9;

FIGURE 11 is a view in section taken on line **11—11** of FIGURE 9;

FIGURE 12 is a view in section taken on line **12—12** of FIGURE 9;

FIGURE 13 is a view in section taken on line **13—13** of FIGURE 9;

FIGURE 14 is a detailed plan view of the cam yoke and plunger;

FIGURE 15 is a view in side elevation of the cam yoke and plunger;

FIGURE 16 is a view in front elevation of the backspace adjustment plate;

FIGURE 17 is an enlarged fragmentary plan view of the top character wheel;

FIGURE 18 is an enlarged fragmentary plan view of the character wheel similar to FIGURE 17 with the character elements removed;

FIGURE 19 is a view in section taken on line **19—19** of FIGURE 17;

FIGURE 20 is a top plan view of a ratchet element used with the character wheel;

FIGURE 21 is a view in side elevation of the ratchet element;

FIGURE 22 is a plan view of a ratchet spring with the full bodied lines indicating the natural position and the dotted lines indicating the position when installed in the machine;

FIGURE 23 is a detailed view of a backup trigger used with the backspacing mechanism;

FIGURE 24 is a bottom plan view of the tag holder removed from the carriage frame;

FIGURE 25 is a view similar to FIGURE 24 but showing the tag retaining mechanism operated;

FIGURE 26 is a view in section taken on line **26—26** of FIGURE 24 substantially enlarged and showing a tag in unlocked position;

FIGURE 27 is an enlarged view in section taken on

line 27—27 of FIGURE 25 showing the tag locked in position;

FIGURE 28 is an enlarged view in section taken on line 28—28 of FIGURE 24;

FIGURE 29 is an enlarged view in section taken on line 29—29 of FIGURE 25;

FIGURE 30 is a fragmentary bottom plan view on a reduced scale of the retainer place structure shown in FIGURES 26 through 29;

FIGURE 31 is a view in side elevation of the retainer support for the tag holder;

FIGURE 32 is a view in section taken on line 32—32 of FIGURE 31;

FIGURE 33 is a fragmentary view in elevation showing the carriage return mechanism and linkage;

FIGURE 34 is a view in longitudinal section and partly in elevation of the carriage return mechanism;

FIGURE 35 is an enlarged fragmentary top plan view of the upper right hand portion of the carriage return mechanism shown in FIGURE 33;

FIGURE 36 is an enlarged view in side elevation taken from the right side of the machine showing the carriage return mechanism;

FIGURE 37 is a view in section taken on line 37—37 of FIGURE 36;

FIGURE 38 is an enlarged top plan view showing the carriage frame with the tag holder removed and the casting support for the character wheels with the character wheels removed;

FIGURE 39 is a view in front elevation of FIGURE 38 and additionally showing the support to the frame of the machine in section;

FIGURE 40 is a fragmentary view in front elevation of the carriage return showing the operating linkage;

FIGURE 41 is a view of a portion of the carriage return mechanism and operating linkage in side elevation taken from the right side of the machine;

FIGURE 42 is a bottom plan view of the carriage frame;

FIGURE 43 is a top plan view of a portion of the carriage frame showing the ratchet mechanism;

FIGURE 44 is an enlarged bottom plan view showing the ratchet mechanism of the carriage frame;

FIGURE 45 is a view in section taken on line 45—45 of FIGURE 43;

FIGURE 46 is an enlarged view in section taken on line 46—46 of FIGURE 42 showing the carriage frame handle;

FIGURE 47 is a detail view of a feed pawl lever used with the carriage frame;

FIGURE 48 is a view in section taken on line 48—48 of FIGURE 47;

FIGURE 49 is a detail view of the tag line spacer rack;

FIGURE 50 is a top plan view partly in section showing the carriage rail;

FIGURE 51 is a view in front elevation of the carriage rail;

FIGURE 52 is a view of a typical metal tag adapted to be used in the tag holder;

FIGURE 53 is a view of the tag of FIGURE 52 with typing from the machine upon it;

FIGURE 54 is a view showing the tag in dotted lines between type characters arranged for debossing;

FIGURE 55 is an end view of one of the type characters showing the letter "L"; and

FIGURE 56 is a schematic wiring diagram of the control system for the type character elements.

The automatic marking machine of this invention is generally identified by the reference numeral **70** as shown in FIGURES 1 and 2. For ease of description, the main components of the machine will be first described and then these components will be further discussed in detail. The machine's principal components comprise a frame **72**, a cover **74**, a keyboard **76**, a carriage rail **78**, a carriage frame **80**, and a workpiece or tag holder **82**, as the externally visible components. Within the frame are vertical frame supports **84**, which support a cam and clutch housing **86**, a motor **88**, and a character wheel support housing **90**. An upper character wheel **92** and a lower charatcer wheel **94** integrally connected are mounted upon the housing and adapted to be operated by an operating arm mechanism **96**, while a ratchet mechanism **98** is adapted to stop the rotation of the wheels at a preselected character position through the action of a magnetic clutch **100** supported underneath the clutch housing.

The character wheel structure for character wheels **92** and **94** is best shown in FIGURE 6. As there shown, these wheels are operatively connected to a double sheave pulley **102** and are kept normally rotating by means of friction clutch spring **104**. Pulley **106** connects the pulley block with the lower pulley half **108** of the magnetic clutch, which is kept constantly rotating through the action of the motor. Thus, the frictional engagement of the constantly rotating pulley block **102**, thrust upwardly through the friction clutch spring **104**, serves to rotate the character wheels **92** and **94** in normal operation about the stationary vertical support rod **110**, until the wheel is stopped in a preselected position against the force of the friction spring in a marking operation as will be later described.

The wheels **92** and **94** are constructed as a fixed unit and rotate together. They are spaced from one another to leave a space **112** so that a workpiece or tag may be acter elements positioned around its periphery and the inserted therebetween. Each of the wheels has 44 character elements positioned around its periphery and the character elements are generally indicated by the reference numeral **114**. The character elements are constructed so as to operate resiliently by a resilient spring **116** attaching them to a center disk portion **117** of the wheel, while the character element head **118** is positioned on the periphery of the wheel and can move in reciprocating fashion through guide openings **120** that are formed by vertical holes. It will be understood that the character elements may be arranged for either embossing or debossing as will be readily apparent to those skilled in the art. In the embodiment shown, the top wheel is provided with character head elements which are male in character and operate as a punch, while the bottom character elements have recessed character elements and operate as a die so that a debossing arrangement is provided.

The character element heads **118** have a flat top and are adapted to be struck by an operating arm contact member so that for the upper wheel **92** the character elements are moved downwardly against the tag. In like fashion the character elements in the bottom wheel **94** are adapted to be struck upwardly so that the two character elements are moved toward one another to form a character on the tag when it is positioned between them.

The operating arm mechanism **96** is comprised of an upper operating arm **122** and a lower operating arm **124**, each of which is pivotally mounted upon the vertical support **110** at the upper and lower ends respectively. This arrangement is best shown in FIGURE 2. The contacting portion or striking portion of the upper operating arm **122** comprises a striker member **126** pivotally mounted to the front end of the operating arm, and, as shown in FIGURES 1 and 6, this is positioned directly over the front character element upon the outer periphery of the wheel locking at the wheel from the front of the machine. The bottom operating arm **124** is likewise connected at its forward end to an operating or striking member **128**, which extends upwardly through the cover plate **129** of the character wheel housing which has an opening therein serving as a guide.

The mechanism for actuating the upper and lower operating arms **122** and **124** is best shown in FIGURES 2 and 9–15. As there shown, a cam rod **130** having

converging cam surfaces **132** is adapted to be moved backwardly and forwardly along the axis of the machine as best shown in FIGURE 9. In so doing, it will contact rollers **134** mounted upon contact blocks **136** of which there are a pair as shown in FIGURE 9, and which move vertically within guide channel **138** formed at the top and bottom of the character wheel casting. When the blocks **136** move apart from one another they move the driving ends, that is the rear ends of the upper and lower operating arms **122** and **124**. The rear ends of these operating arms are biased by springs **140** and **142** to hold them against these reciprocal blocks.

The cam rod **130**, as best shown in FIGURES 12 through 15, is formed as part of a cam yoke **144**, which is movable back and forth within the casting **86** by a pair of cam lobes **146** and **148** connected to a clutch shaft **150**. The top lobe **148** is adapted to contact a top roller **152**, carried by the cam yoke, and the lower lobe **146** is adapted to contact a cam roller **154**, positioned underneath the first of these rollers. By this structure the yoke is moved back and forth within a track formed within the casting **86** as shown in dotted lines in FIGURES 12 and 13.

The clutch shaft **150** is normally stationary and is adapted to be moved only when a character is typed, which action is effected when the clutch **100** is clutched by the switching mechanism operated when a typewriter key is operated, as will further be described. The clutch structure includes a top toothed clutch head **156** keyed to the clutch shaft **150**, and a bottom toothed clutch head **158**, which in turn is connected to the motor through a gear box **160**. The lower clutch head forms part of the pulley **108**, previously described, and which furnishes power to the character wheels through the pulley belt **106**.

The operating mechanism for actuating the clutch head **156** and moving it into engagement with the lower clutch head **158** is best shown in FIGURES 9 and 11. As there shown, a magnetic clutch actuating arm, which is generally of L-shaped construction, is indicated by reference numeral **162**. This actuating arm **162** is shown in the unoperated position in FIGURE 11 adjacent a solenoid **164** forming part of the magnetic clutch. The clutch actuating arm **162** is in turn connected by a yoke **165** to a groove **166** around the periphery of the clutch head **156**. The clutch head is keyed to the clutch shaft **150** by appropriate key mechanism **168**. The actuation of the solenoid **164** moves the actuating arm clockwise about its pivot point **170** to move the clutch head downwardly and into engagement with the lower clutch head **158**.

The means for selecting a particular character element for typing is best shown in FIGURE 3. As there shown, for the character wheel containing forty-four elements, and it will be understood that this may be varied, there are provided twenty-two ratchet teeth **172** around the periphery of the lower character wheel. These teeth are mounted on a ring connected to the outer end of the lower wheel body **94** by a rubber cushioning rim **173**, as best shown in FIGURE 6. The rubber rim acts as a sound deadener when the ratchet teeth are engaged by ratchet levers to be described below. In order to stop the character wheel at a preselected position so that the desired character element is positioned in line with the operating or striking elements of the upper and lower operating arms, two ratchet solenoids **174** and **176**, as shown in FIGURE 3 are used. Each of these has a pivotable ratchet **178** which is spring biased by means of a spring **180** out of contact with the ratchet wheel. It is noted that both of these ratchet elements having a ratchet tooth **180** are positioned such that when one ratchet tooth engages a ratchet element **172** on the wheel the other is positioned one-half a ratchet element length away as shown in FIGURE 3. This provides for faster operation and in this manner only twenty-two ratchet elements are needed for the forty-four character elements. The character wheel housing **90**, as shown in FIGURE 56, is provided with a commutator housing **500**, and separate commutator segments **502**, equal in number to the character elements on the character wheel. This housing also carries a brush ring **504** which cooperates with a brush element **506** affixed to the character wheel. The brush is adapted to maintain ring contact and also sweep the annular series of commutator segments **502** as is well understood in the art. A keyboard assembly **510** is associated with the commutator and has a plurality of key elements **512** which are associated with the character elements upon the character wheel. The keyboard plate **510** is connected to the frame of the machine as best shown in FIGURES 1 and 2. Each of the keys **512** and **513** have a spring biased switch element **514** as best shown in FIGURE 4.

In order to obtain greatest speed and positive operation of the printing cycle, the keys and the commutator segments **502** are divided into two groups corresponding to the two ratchet levers or elements for ratchet solenoids **174** and **176** of FIGURE 3. This greatly assists in the operation since there is a slight time lag in the magnetic ratchet actuation responsive to the key operation, and it is preferred that the large ratchet elements **172** be employed as they have a greater arc length than would be the case if a single ratchet were employed having twice as many elements.

Actuation of the on-off switch **516** supplies current to the several circuits controlled by the keys **512** and **513**, but none of these circuits is energized until a key is depressed to actuate its associated switch **514** to the closed position. The diagram of FIGURE 56 includes only one representative circuit for each of the two key groups **512** and **513**, it being understood that there are many circuits, one for each key through its own segment of the commutator to the relay of its key group. In this diagram it is clear that the upper left key **512** and its switch is associated with its commutator through lead **518** and that other switches are associated with their relay through the proper commutator segments by individual leads.

For the circuit of the key shown, current from one side **520** of the supply line leads to the switch **516** and by lead **522** connects with the brush ring **504** so that the brush is always on one side of the circuit. Since the final completion of the circuit when the key **512** is operated is made between the brush and the commutator segment **502** associated with the key, the circuit from segment **502** is seen to include lead **518** to keyboard switch **512** and lead **523** from the switch to terminal **526** at relay **528**. Relay **528** acts to hold the magnetic clutch coil **164** and the ratchet coil **174** energized for a desired time interval.

Relay coil **530** within the relay **528** is connected to lead **523** at one side and at the opposite side to the power line at lead **534**. In the latter lead, a deenergizing switch **536** is inserted for a purpose later appearing. Energization of relay coil **530** closes the contacts **538** so that the lead **540** from switch **516** places the relay coil **530** across the lines **520–534** to constitute a holding circuit for the relays. At this time key **512** may be released.

Simultaneously with the closure of contacts **538**, a second pair of contacts **542** and a third pair of contacts **544** are closed. Contacts **542** are connected by lead **546** to the solenoid ratchet actuator **174** and the opposite side of the actuator is connected by lead **548** to the supply line **534** at terminal **550** for the magnetic clutch actuating relay **164**.

Contacts **544** act to place the magnetic clutch actuator **164** in the main circuit through the lead connection **552**. It should be understood that the above-described circuits for the ratchet solenoids and the magnetic clutch solenoid are not actually completed upon depressing the key **512**, but merely establish a proper circuit so that when the brush **504** rotates into contact with the commutator segment **502** associated with the depressed key, the circuit is then established. At this time the ratchet solenoid **174**

actuates its ratchet lever **178** to engage the ratchet element **172** upon the character wheel to stop it at the proper position for marking of the selected character. It will be understood that one-half of the required keys are associated with the ratchet solenoid **174** and the other one-half are associated with the other ratchet solenoid **176** to evenly distribute the load, as aforementioned, and increase the speed of operation. Concurrently with the actuation of the ratchet solenoid **174** for example, the magnetic clutch relay **164** is operated and the magnetic clutch head **156** is engaged thereby with the rotating lower clutch head **158**.

Rotation of the clutch shaft **150** rotates the cam lobes **146** and **148** and causes the cam yoke to move forwardly, driving the cam rod **130** towards the front of the machine. As the cam rod **130** is moved forwardly, its cam surfaces spread apart the cam blocks **136** and cause the operation of the upper and lower operating arms **122** and **124**, as best shown in FIGURES 2 and 9.

Upon the operation of the operating arms, the character elements in the character wheels are contacted or struck to imprint a character upon the tag placed within the wheel. A one-half revolution of the cam shaft is required to complete the marking cycle due to the arrangement of the cam lobes **146** and **148** at right angles with respect to one another as shown in FIGURE 12, and their engagement with the cam yoke. Upon the return of the cam yoke to a starting point in this cycle, a conventional switching mechanism (not shown) is employed to open the deenergizing switch **536**.

The opening of switch **536** breaks all of the holding circuits created at the relay **528** and each of the contact pairs **538**, **542** and **544** are opened. At this time the magnetic clutch assembly disconnects and the lower clutch head **158** is released to reestablish its driving operation. Accordingly, magnetic clutch shaft **158** comes to rest and as the ratchet relays are released the character wheels are free to rotate again. This rotation begins anew as the lower clutch head **150** will rotate the character wheels through the pulley belt **106** between the pulleys **108** and **102**, and driving engagement with the character wheel is reestablished through the friction clutch spring **104**. The remaining circuit of FIGURE 56 for the typewriter key **513** is substantially identical to that previously described for key **512**. For key **513** it will be understood, as shown in the drawing, that it is operatively associated with a separate commutator segment **502** associated with it individually. Key **513**, as shown in the drawing, is adapted to be connected in circuit to the second ratchet solenoid **176** and also the No. 2 relay in the hold relay **528**, and the electrical circuit is identical with that previously described for key **512**.

It will be understood that in the diagram of FIGURE 56, and as previously brought out, that the deenergization switch **536** will function to break each of the circuits in the machine after the clutch shaft **150** has made a one-half revolution. The breaking of each one of these circuits automatically reestablishes the rotation of the character wheels until another typewriter key is depressed.

The carriage frame **80** is best shown in FIGURES 1, 3, 6, 38, 39 and 42. As there shown, it is comprised of a casting body **180** and is supported upon the carriage rail **78** by a pair of rollers **182** and **184** mounted upon a horizontal axis and situated at the rear of the frame at the left and right sides, respectively. Rear rollers **186** and **188** are also mounted upon the carriage frame on a vertical axis to engage the rear of the carriage rail. Front rollers **190** and **192** are likewise mounted upon a vertical axis and engage the front of the carriage rail so that a secure sliding engagement upon the rail is provided. A left side carriage stop member **194** is provided which is adapted to abut against a rail stop member **196**. Likewise, on the right side, a frame stop member **198** is provided, which is adapted to contact a carriage return stop lever **200** positioned within a guide bracket **201**.

The carriage frame is also provided with a pair of downwardly depending legs **202** and **204**, as best shown in FIGURE 39. The legs support a pair of flanged wheels **206** and **208** which hug the bottom of the carriage rail. This structure completes the sliding connection of the carriage frame to the carriage rail.

In order to provide horizontal or transverse advancement of the carriage along the carriage rail from the left to the right positioned viewed at the front of the machine, a horizontal rack bar **210** is connected between the legs of the carriage frame. In the terminology used, it will be understood that, as in the standard typewriter, the term horizontal is meant to mean transverse movement across the machine, while later on in the description vertical movement with respect to advance of the tag or other workpiece to be typed upon will be meant to imply movement from the front to the rear as in the standard letter, and in a typewriting machine where the letter is advanced vertically from one line to the next line. All of the above movements are in a horizontal plane.

The horizontal rack is provided with tooth elements **212** at the bottom. A feed pawl lever **214**, as shown in FIGURES 47 and 48 having tooth elements **216** and **218** is provided to obtain controlled movement of the carriage frame upon the horizontal rack bar. The lever is pivotally connected to a pawl link **219** which, in turn, is pivotally mounted upon the carriage rail **78** as best shown in FIGURES 50 and 51. The feed pawl lever is held in normal engagement with the rack bar with the toothed elements engaging the notches therein by means of a biasing spring **220**, as shown in FIGURE 50, which fits on the back of the carriage rail and urges a stud shaft **222** fitting through an opening in the carriage rail to an upward position. The feed pawl lever is pivotally connected at its other end, as shown in FIGURE 51, to an operating arm **224**. This operating rod is spring biased to a downward position by a spring **226**. The operating rod is further provided with a collar **228** and is connected to the end of the lower character element operating arm **124** by an arm member **230** having an opening through which the rod **224** fits as best shown in FIGURE 40. By means of this structure, every time the character wheel operating arms are operated, when a key is typed, the feed pawl lever is operated and the carriage frame at the completion thereof is advanced one notch along the horizontal rack **210**.

The feed pawl operating lever **224** also serves as a spacer bar operating mechanism. Thus, as shown in FIGURES 6 and 39, the operating rod **224** is fixed to an arm **232** of a reciprocally movable armature **234** of solenoid **236**. The solenoid is connected by leads **238** and **240** to a spacer bar **242** mounted upon the key board of the machine as shown in FIGURE 1. The spacer bar is provided with a spring biased contact switch similar to the character keys otherwise described in this specification. Upon the operation of the spacer bar, the solenoid is operated and the armature is moved upwardly to provide the same movement to the operating arm **224**, as previously described, when the operating arms of the character wheels operate. This operation likewise causes the carriage frame to move one space to the left when the feed pawl lever is disengaged.

The movement of the carriage frame when the feed pawl lever is disengaged, either upon the typing of a character or upon the operation of the spacer bar, is effected by spring action, which constantly biases the carriage frame to the left of the machine. This biasing action is effected by a tape **244**, as best shown in FIGURE 39, which is connected at one end to a stud **246** upon the leg **204** of the carriage frame and is connected at its other end to a spring loaded reel **248** mounted upon a vertical support extending from the frame of the machine.

A manual means for disengaging the feed pawl lever is provided by a pair of frame disengaging buttons **250** and **252** situated upon the sides of the carriage frame as

shown in FIGURE 38. As shown in FIGURE 6, these buttons are connected to a carriage frame disengaging rod pivoted at its opposite ends **254** and **256** to the sides of the carriage frame. An engaging portion **258** of this rod is bent downwardly, as viewed in FIGURE 6, and, upon operation of the disengaging button, is adapted to contact a disengaging pin **260** extending from the side of the feed pawl lever. This engagement causes the downward movement of the feed pawl lever to disengage the teeth from the horizontal rack bar permitting the carriage frame to be moved laterally, that is to say horizontally in either direction across the machine, as desired.

The back spacing mechanism, as shown in FIGURE 4, comprises a back spacer kay connected to an operating rod **264** engageable with an arm **266** of a pivotal rod **268** mounted for pivotal operation upon a support **270**. The rear end is mounted for pivotal relation within a support **272** as shown in FIGURE 3 and has a hooked end fastened to a vertically movable operating member **274**, which is receivable within a support bracket **276**. The operating member **274** has a horizontal arm **278** at the top, as best shown in FIGURES 3 and 33, which is adapted to contact the free end of a pivot arm **280** pivoted upon a pivot shaft **282** mounted on a pivot block **284**. The front end of the pivot block is provided with a back-up trigger **286**. The pivot arm **280** is biased to an upward position by a biasing spring **288**. The pivot block and the back-up trigger are biased to a clockwise position by a biasing spring **290**. The free end of the back-up trigger extends through an opening in the carriage rail as best shown in FIGURES 1 and 51, and is adapted to engage a notch **292** in a back-up rod **294** mounted for sliding movement upon the front of the carriage rail. This back-up rod has a flanged left end as shown in FIGURE 50, indicated by reference numeral **296**, and is provided with a toothed member **298** which is engageable with the notched teeth of the horizontal rack bar **210**.

The operation of the back-up bar through the back-up trigger, the pivot arm, and the actuating member is effected by vertical striker pins **300** shown in FIGURE 3 and FIGURES 33 and 34, which are mounted upon pulley **302**. This pulley mounted upon the supporting casting **276** is connected by pulley belt **304** to the top sheave of the double sheave pulley block **102**, previously described. It will be noted, as shown in FIGURE 34, that the operating arm **278** is of substantial thickness, such that at the completion of the operating arm movement, when the striker pins have moved the pivot arm to the clockwise position as shown in FIGURE 33 to move the pivot arm downwardly as viewed in FIGURE 33 and away from the operating arm, it cannot be returned to its original position to be struck by a striking pin again, as it is blocked by the end of the operating arm and this prevents repeated backspacing. Should, however, repeated backspacing be desired, the operating arm member **278** can be extended in length, as will be readily understood. In the aforementioned operation, the biasing spring **288** keeps the pivot pin out of the path of the striking pin and in engagement with the end of the aforementioned operating arm. A cam to be described later in conjunction with the back spacing adjustment mechanism is also employed in this operation.

The carriage return mechanism, which moves the carriage frame from left to right across the machine, is best shown in FIGURES 34, 36, 37 and 39. A carriage return key **310** upon the keyboard has a spring biased switch in the same fashion as the other keyboard elements and is connected by leads **311** to solenoid **312** shown in FIGURE 34. The solenoid has a vertically reciprocal armature **314** connected to one end of a clutch arm **316**. The other end of the clutch arm is pivotally connected to a support at **318**. An adjustment bolt **320** is threadedly connected at the center portion of the brake arm and abuts against a friction clutch **322**, as shown in FIGURE 34. The friction clutch in turn is connected to a tape reel **324**. One end of a tape **326** is connected to the reel and the other end is connected to an extension leg **328** of the carriage as best shown in FIGURE 39. The armature is normally in the downward position such that the friction clutch is not engaged and the shaft **330**, to which the friction clutch is mounted and which is connected to the pulley **302**, does not tend to move the tape reel so that there is no tension upon the tape. When the carriage return key is operated, however, the solenoid **312** is energized and the clutch arm **316** is operated, causing the friction clutch to furnish torque from the shaft **330** to the tape reel and tension the tape **326** and move the carriage frame from left to right upon the carriage rail.

A stop mechanism **220** is provided for the carriage return device which is best shown in FIGURE 34. This is designed to keep the carriage from running too far to the right on the machine, and a contact rod **334**, mounted for pivotal operation on the support casting **276**, is provided. The rod **334** is adapted to be contacted by the carriage frame stop member **198** as best shown in FIGURE 3 when the carriage frame moves to the right of the machine. The lower end of the rod **334** is connected to striker arm **336**, which is adapted to contact a latch arm **338**. The latch arm **338** has a shoulder **340**, as shown in FIGURE 37, and is spring biased by a spring **342** to engage the clutch arm **316**. In this operation, when the carriage frame contacts the rod **334**, the rod will pivot and the striker arm **336**, which had locked the clutch arm in place upon the actuation of the carriage return key, will be disengaged.

Associated with the backspacing mechanism is a multispace back spacing lever **346** as best shown in FIGURES 33 and 36. This lever is pivoted at the same pivot point **348** as the aforementioned backspacing pivot block. It is used for multispace adjustment in backspacing and has an adjustment blade **350** which can be moved into any one of three notches upon and adjustment stud **352** mounted at the rear of the carriage rail as best shown in FIGURE 36. The lever is further provided with a cam surface **354**, which slopes upwardly and is adapted to be contacted by the pivot arm **280** to limit its length of travel. The length of travel of the pivot arm determines the degree of backspacing whether it be one, two or three spaces. Since the cam surface, viewing it from the front, slopes upwardly from right to left, the pivot arm when it is moved counterclockwise by contact with the striking pins **300** upon the pulley **302** will be caused to ride upwardly out of contact with the striking pins when the cam surface is engaged. When this point in the operation is reached, the pivot arm will then be returned at the end of the operation to starting position by spring action. When the backspacing key element is released, the operating arm **278** is moved upwardly and the pivot arm again moves underneath it to be ready for a new backspacing operation.

The mechanism for holding the workpiece or tag to be typed upon is termed, for convenience, a tag holder and is generally indicated by the reference numeral **82** and is best shown in FIGURES 3, 24 through 30, 38 and 39. As there shown, it is carried upon the top of the carriage frame by support to a retainer support **360**, best shown in FIGURES 31 and 32. The retainer support is mounted upon a rod extending axially along the machine and supported on the carriage frame. This rod is designated by element **362** as shown in FIGURE 39.

The tag holder, as shown in FIGURES 24 through 30, has a main body section **364** and a jaw section **366** with a shoulder **368** extending around it whereby a tag **370** may be received. The tag **370** shown in FIGURES 52 and **53** may be made of light sheet metal or any deformable material such as various types of plastic and

the like. As shown in FIGURES 28 and 29, a spring biased tongue member **374** is connected to the bottom of the tag holder by a leaf spring **376**. The tongue member is provided with a shoulder **380** adapted to receive the edge of the tag. A movable lock member **382**, and movable to a slight degree along the axis of the machine, is also mounted in the tag holder and has a handle **384** whereby this manual movement may be effected. A forward lip element **386** is provided on the lock member which is adapted to engage with a shoulder **388** formed on the jaw of the tongue member **374** as shown in FIGURES 28 and 29. The lip member **386** is further provided with a pair of spring biased lock elements **390** as shown in FIGURES 26 and 27, which have lock notches **392** adapted to engage the edge of the tag in the locked position shown in FIGURE 27.

The tag holder is connected to the retainer support **360** by a pair of bolts **394**. These bolts also serve to retain a tag holder handle **396** as shown in FIGURE 26.

The means for advancing the tag holder and the tag vertically, that is into and out of the jaw **112** of the character wheels, are best shown in FIGURES 31, 32, 38, 39, 41 through 46 and 49. This mechanism comprises a feed rack **400** mounted at the bottom of the carriage frame and extending axially from the front of the carriage frame to the rear as shown in the bottom plan view of FIGURE 42. This relationship is also shown in the sectional view of FIGURE 45. The rack has a rack blade element **401** extending to one side with the series of rack teeth **402** which are adapted to be engaged by a pair of pawls **404** and **406**, the latter being slightly longer than the former. An advancing handle **408** is keyed to the end of the rack **400** as shown in FIGURE 42; a biasing spring **409** retains the handle in the unoperated position until it is operated against the action of the spring.

The two pawls **404** and **406** are retained against the bottom of the tag holder retainer **360** by a retainer plate **410** and a bolt **411** as shown in FIGURE 45. The pawls are each urged into contact with the teeth **402** of the vertical ratchet bar by means of two biasing springs **412**, as best shown in FIGURES 43 and 44. The tag holder retainer support is biased to move to a rearward position by means of a biasing spring **414** connected at one end to a stud **416** fixed to the bottom of the tag holder retainer and at its other end the spring is connected to an anchor element **418** at the bottom of the carriage frame as shown in FIGURE 42.

By means of this structure, when the handle **408** is depressed, the rack blade is moved downwardly in the direction of the arrow shown in FIGURE 45 out of engagement with the engaged pawl and the tag holder retainer, and the associated tag moves one-half notch in the direction of the arrow shown in FIGURE 44 where it is engaged by the other pawl. This relationship is established as the pawls **404** and **406** differ in length by what amounts to one-half notch. Thus, when one pawl is engaged and notched, the other is situated one-half the way between the notches as shown in FIGURES 43 and 44. This relationship provides for a stepwise advancement of the tag holder with first one pawl **404** and then the other pawl **406** being engaged by the ratchet teeth as the handle **408** is operated. In this operation the ratchet bar is swung from first one pawl to another in the slight degree of rotational movement afforded it by the movement of the handle.

Automatic vertical adjustment is also provided in conjunction with the operation of the carriage return key. This is effected through a dog element **420** fixed to the bottom of the spring biased vertical rack rod **400** best shown in FIGURE 39. This dog is adapted to contact a stud **422** extending from the rear of the carriage rail, as shown in FIGURE 50, and, in so doing, the tag holder is advanced just as if the handle **408** had been operated.

Operation

First of all in order to operate the machine, the tag holder is first withdrawn to the front of the machine by grasping the handle **396** and moving it to the front as desired. Then a tag **370** is placed within the tray of the tag holder by withdrawing the lock handle **384** against the action of the biasing springs, cocking the mechanism, and, when the tag **370** is inserted, pressed downwardly at front center, the lock handle **384** is released into gripping engagement with the tag. The tag holder is then advanced to the rear of the machine so that the top portion of the tag is in a desired marking position. Appropriate horizontal centering of the tag in line with the operating elements, or striker members, **126** and **128** of the upper and lower operating arms, respectively, may be provided by operating the carriage frame release buttons **250** and **252** and moving the carriage frame to the desired position.

In order to feed the tag into the proper vertical alignment so that the tag is situated at the proper position underneath the character wheel, the vertical feed adjustment handle **408** is operated. This turns the rack bar **400** and puts the pawls **404** and **406** in feeding engagement one-half notch corresponding to one vertical line during each operation of the handle. The handle may be operated the desired number of times to provide the proper positioning.

The machine is turned on by operating the on-off switch **516**. When so operated, the character wheel will be started in rotary operation by power furnished through the constantly rotating lower clutch head **158** and its associated pulley **108** through pulley belt **106** to the pulley block **102**. The connection to the character wheels is then established by the friction clutch spring **104**. This is the normal operation of the machine when no keys are depressed and it will also be noted that in addition to the character wheel being rotated in this condition the pulley wheel **302** is also kept rotating through the action of the pulley belt **304** connected to the double sheave pulley block **102**.

When a character key **512** is operated, the associated character element will be brought into position underneath the striking elements of the operating arm by the electrical control system. This is effected as previously described in connection with FIGURE 56 by the closing of a circuit when the commutator segment **502** is contacted by the commutator brush **506**. When this circuit is completed, the magnetic clutch **100** is actuated and the ratchet solenoid **174** is likewise actuated. Upon the actuation of the ratchet solenoid **174**, the ratchet **178** is moved to engagement with a ratchet tooth **172** and the character wheel is stopped in the selected position.

The actuation of the magnetic clutch **100** is effected by the operation of its associated clutch solenoid **164**, which operates the armature **162** to move the upper clutch head **156** into engagement with the lower clutch head **158** and thereby close the clutch. This closing or operation of the clutch furnishes power to the clutch shaft **150**. In turn, the cam lobes **146** and **148** are rotated to move the cam yoke **144** and cam rod **130** forwardly. This spreads apart the slide blocks **136** and operates the upper and lower operating arms **122** and **124** to strike the character elements and cause a character to be punched upon the tag **370**.

The tag holder and tag are then advanced automatically to the next horizontal spaced by the operation of the feed pawl **214**, which engages the horizontal rack **210**. The operation of the feed pawl is effected by the actuation of feed pawl rod **224** which is moved by the arm **230** connected to the bottom operating arm **124**. This actuation causes the feed pawl lever to release from engagement with the horizontal rack which is then moved one notch by the spring biased tape **224**.

It will be understood that the character keys are divided up in keys **512** and **513** so that twenty-two of the forty-

four character keys operate with the ratchet solenoid **174** and the remaining twenty-two are connected to the solenoid **176**, and the operation of the latter is similar to the former as will be readily apparent.

Should erasing be required, an erase key (not shown) **515** may be operated. This key is connected just as are the other keys with respect to circuitry in FIGURE 56, but, instead of having a character element, the character head **118** is flat so that it may be used to hammer out or erase the previously typed character upon the tag.

The spacer bar **242** is operated where spaces are required in the normal fashion of typical typewriter usage. When so operated, a circuit is directly connected to the solenoid **236** which has an armature connected to the feed pawl rod **224** actuating the feed pawl **214** and permitting the carriage frame to be advanced one horizontal space. This circuitry and direct connection, as aforementioned, obviates the previously described circuitry so that the magnetic clutch need not be operated. Likewise the ratchet solenoids are not operated and the carriage frame is advanced one space independently of any other actuation of the typewriter mechanism.

For backspacing, the backspaced key **262** is operated. This actuates linkage through rod **264**, the connecting rod **268**, over to the slide bar **274**. This, in turn, depresses the end of the pivot arm **280** so that it is engaged by the striker pins upon the pulley **302**. This rotates the pivot pin and its mounting pivot block and the backspacer trigger **286** to move the backspacer bar **292**. The degree of backspacing is effected by the cam plate **346** as the cam surface **354** defines the limit of travel of the pivot arm and the length of the backspace. This degree of backspace can be adjusted by moving the adjustment plate **346** so that the knife edge **350** engages a different adjustment groove upon the adjustment rod **352** fixed to the rear of the carriage rail at the lefthand side of the machine.

The carriage return mechanism is controlled by the operation of the carriage return key **242**. Actuation of this key closes a switch to the solenoid **312** which operates the clutch armature **316** causing friction clutch engagement of the tape reel **324** with the constantly rotating pulley shaft **330**. This places tension upon the carriage return tape **326**, moving the carriage frame from left to right across the machine. An automatic stop is provided by element **200** which is contacted by the stop member **198** on the carriage frame causing the actuation of the pivot rod **334**, which, in turn, moves the arm **336** to disengage the latch **338** from the brake armature **316**. The latch **338** is biased into normal latching engagement with the armature to hold it into engagement with the clutch **322** so that when the latch is disengaged the clutch is likewise disengaged.

When the carriage is returned to the desired tag position, the tag may be advanced vertically one more line underneath the character wheel by operation of the vertical tag holder advancement lever **408** in the manner previously described. Where several vertical lines of adjustment are desired, the handle is pushed repeatedly the desired number of times.

When the typing has been completed, the tag holder is moved forwardly by grasping it upon the handle **396** and withdrawing it to the front of the machine. The lock handle **384** is then withdrawn and the tag removed from its holder.

Various changes and modifications may be made within this invention as will be readily apparent to those skilled in the art. Such changes and modifications are within the scope and teaching of this invention as defined by the claims appended hereto.

What is claimed is:

1. A marking machine comprising rotatable upper and lower character wheels supported and being relatively rotatable upon a vertical shaft fixed with respect to the machine, said character wheels being spaced from one another and being provided with mating character elements, means for rotating said character wheels comprising a clutch mounted concentrically upon said fixed vertical shaft and cooperating with said wheels, and means for operating said character elements comprising an operating arm associated with each of said character wheels and positioned to strike a character element, each of said operating arms being pivoted upon the vertical shaft, one at the top and the other at the bottom of the shaft, and each of said arms having contact means at one end for striking the character element and reciprocating operating means at an end opposed to the contact means for reciprocating the operating arm about its pivoted support, a carriage frame provided with means for moving it horizontally across the machine and a workpiece holder mounted upon the carriage frame provided with means for advancing a workpiece toward said character wheels.

2. A marking machine comprising rotatable upper and lower character wheels supported and being relatively rotatable upon a vertical shaft fixed with respect to the machine, said character wheels being spaced from one another and being provided with mating character elements, means for rotating said character wheels comprising a clutch mounted concentrically upon said fixed vertical shaft and cooperating with said wheels, and means for operating said character elements comprising an operating arm associated with each of said character wheels and positioned to strike a character element, each of said operating arms being pivoted upon the vertical shaft, one at the top and the other at the bottom of the shaft, and each of said arms having contact means at one end for striking the character element and reciprocating operating means at an end opposed to the contact means for reciprocating the operating arm about its pivoted support, ratchet ring means fixed to one of said character wheels, electrically operated ratchet lever means engageable with the ratchet ring means for stopping rotation of the character wheels in a selected marking position, key operated switch means individually associated with each of said character elements, circuit connections between said switch means and said electrically operated ratchet lever means to engage and stop the character wheels in a selected position upon the operation of a selected key operated switch, a carriage frame provided with means for moving it horizontally across the machine and a workpiece holder mounted upon the carriage frame provided with means for advancing a workpiece toward said character wheels.

3. A marking machine comprising rotatable upper and lower character wheels supported and being relatively rotatable upon a vertical shaft fixed with respect to the machine, said character wheels being spaced from one another and being provided with mating character elements, means for rotating said character wheels comprising a clutch mounted concentrically upon said fixed vertical shaft and cooperating with said wheels, ratchet ring means fixed to one of said character wheels, electrically operated ratchet lever means engageable with the ratchet ring means for stopping rotation of the character wheels in a selected marking position, key operated switch means individually associated with each of said character elements, circuit connection between said switch means and said electrically operated ratchet lever means to engage and stop the character wheels in a selected position upon the operation of a selected key operated switch, and means for operating said character elements comprising an operating arm associated with each of said character wheels and positioned to strike a character element, each of said operating arms being pivoted upon the vertical shaft, one at the top and the other at the bottom of the shaft, and each of said arms having contact means at one end for striking the character element and operating means at an end opposed to the contact means for reciprocating the operating arm about its pivoted support, said character elements being each supported by a resilient member upon the periphery of the character wheel and guide means on the periphery of said character wheel permit-

ting the movement of the character element toward the opposite character wheel in an operative position and movement away in a retractable position, a carriage frame provided with means for moving it horizontally across the machine and a workpiece holder mounted upon the carriage frame provided with means for advancing a workpiece toward said character wheels.

4. A marking machine comprising rotatable upper and lower character wheels supported and being relatively rotatable upon a vertical shaft fixed with respect to the machine, said character wheels being spaced from one another and being provided with mating character elements, means for rotating said character wheels comprising a clutch mounted concentrically upon said fixed vertical shaft and cooperating with said wheels, and means for operating said character elements comprising an operating arm associated with each of said character wheels and positioned to strike a character element, each of said operating arms being pivoted upon the vertical shaft, one at the top and the other at the bottom of the shaft, and each of said arms having contact means at one end for striking the character element and operating means at an end opposed to the contact means for reciprocating the operating arm about its pivoted support, the operating means for reciprocating the operating arm comprising a clutch operated cam means, said clutch being engageable upon the operation of character key associated with the character elements, a carriage frame provided with means for moving it horizontally across the machine and a workpiece holder mounted upon the carriage frame provided with means for advancing a workpiece toward said character wheels.

5. A marking machine comprising rotatable upper and lower character wheels supported upon a vertical shaft, said character wheels being spaced from one another and being provided with mating character elements, and means for operating said character elements comprising an operating arm associated with each of said character wheels and positioned to strike a character element, each of said operating arms being pivoted upon the vertical shaft and having contact means at one end for striking the character element and operating means at an end opposed to the contact means for reciprocating the operating arm about its pivoted support, the operating means for reciprocating the operating arms comprising a clutch operated cam means, said clutch being engageable upon the operation of a character key associated with the character elements to connect a cam shaft to a motor, said cam means comprising a cam yoke engageable with a cam shaft and having a cam rod reciprocally operable to engage a slide block means to operate the ends of the operating arms and drive the contact means into engagement with a character element, a carriage frame provided with means for moving it horizontally across the machine and a workpiece holder mounted upon the carriage frame provided with means for advancing a workpiece toward said character wheels.

6. A marking machine comprising rotatable upper and lower character wheels supported upon vertical shaft, said character wheels being spaced from one another and being provided with mating character elements, and means for operating said character elements comprising an operating arm associated with each of said character wheels and positioned to strike a character element, each of said operating arms being pivoted upon the vertical shaft and having contact means at one end for striking the character element and operating means at an end opposed to the contact means for reciprocating the operating arm about its pivoted support, the operating means for reciprocating the operating arms comprising a clutch operated cam means, said clutch being engageable upon the operation of a character key associated with the character elements to connect a cam shaft to a motor, said cam means comprising a cam yoke having a pair of rollers engageable with a pair of cam lobes mounted upon a cam shaft and said cam yoke having a cam rod reciprocally operable to engage a slide block means into operation with the ends of the operating arms and drive the contact means into engagement with a character element, a carriage frame provided with means for moving it horizontally across the machine and a workpiece holder mounted upon the carriage frame provided with means for advancing a workpiece toward said character wheels.

7. A marking machine comprising rotatable upper and lower character wheels supported upon a vertical shaft, said character wheels being spaced from one another and being provided with mating character elements, ratchet ring means fixed to one of said character wheels, said ratchet ring means having a resilient cushioning rim extending circumferentially around the character wheel between said ring means and the outer end of the character wheel to serve as a sound deadening inertia arresting and shock absorbing means when the ratchet ring means is engaged, electrically operated ratchet lever means engageable with the ratchet ring means for stopping rotation of the character wheels in a selected marking position, key operated switch means individually associated with each of said character elements, circuit connections between said switch means and said electrically operated ratchet lever means to engage and stop the character wheels in a selected position upon the operation of a selected key operated switch, a carriage frame provided with means for moving it horizontally across the machine and a workpiece holder mounted upon the carriage frame provided with means for advancing a workpiece toward said character wheels.

References Cited by the Examiner

UNITED STATES PATENTS

1,407,492	2/1922	Steere	197—6.6
1,728,369	9/1929	Schultz	197—6.2
1,893,463	1/1933	McCain	197—6.6 X
2,022,498	11/1935	Glogaud et al.	197—6.7 X
2,133,201	10/1938	Krell	197—6.7
2,157,035	5/1939	Torkelson	101—93
2,927,676	3/1960	Abbondanza	197—66
2,940,386	6/1960	Cetran et al.	101—93
2,951,571	9/1960	Colyer et al.	197—6.7
3,042,175	7/1962	Guttel	197—6.7
3,053,173	9/1962	Klevers	101—93
3,087,361	4/1963	Appel et al.	78—21
3,100,036	8/1963	Toriumi et al.	197—20 X

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