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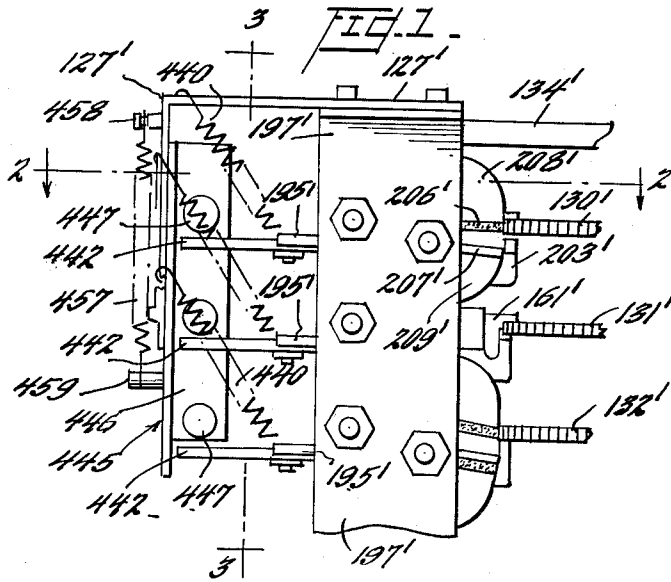
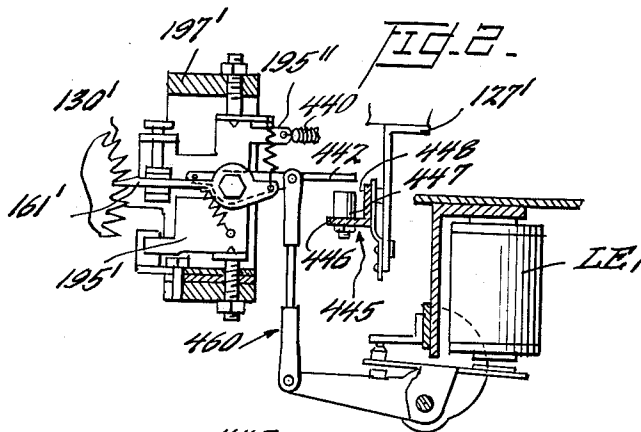
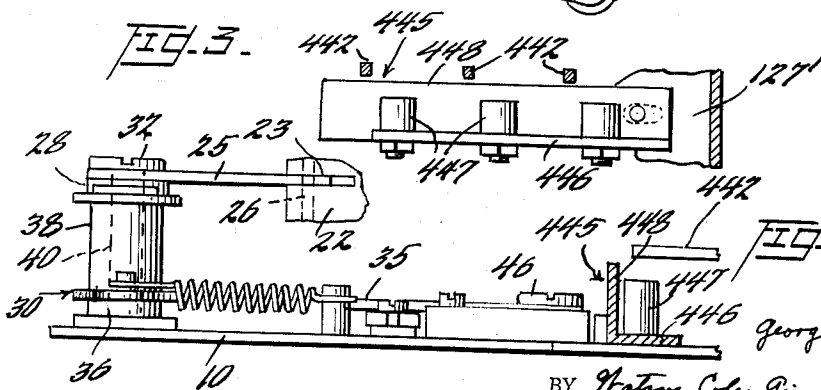
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3,095,076

CARRIAGE ESCAPEMENT MECHANISM

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2 Sheets-Sheet 1



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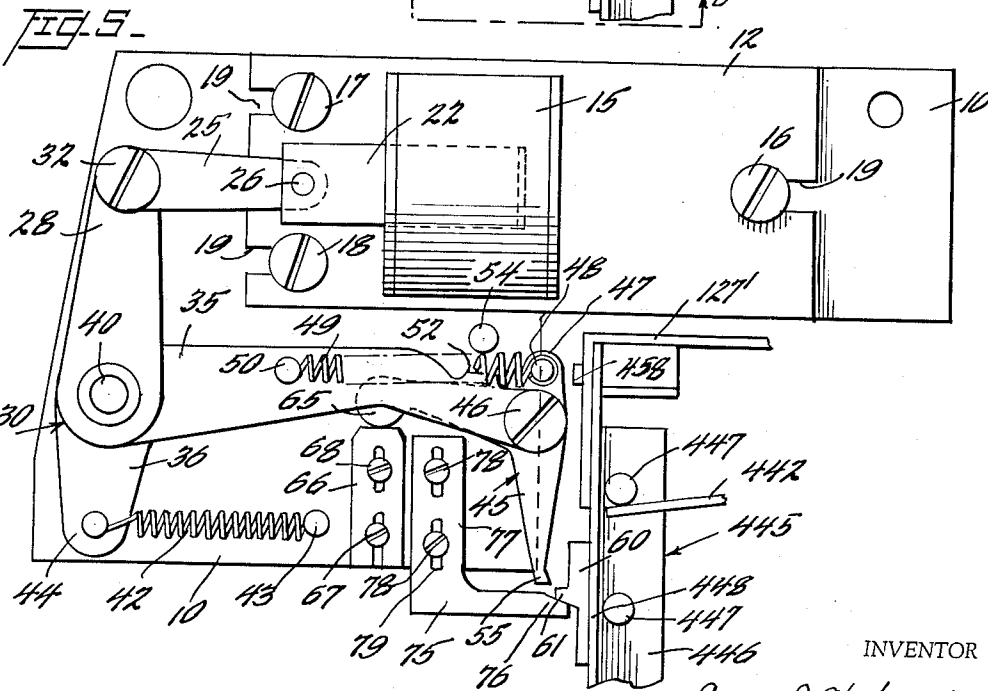
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CARRIAGE ESCAPEMENT MECHANISM

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3,095,076

CARRIAGE ESCAPEMENT MECHANISM

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7 Claims. (Cl. 197-84)

This invention relates to escapement mechanism for high speed electric typographic composing machines, whether of the class of variable escapement typewriting machines or of photo-typographic composing devices.

In certain types of typographic composing machines wherein provision is made for variable escapement of the carriage, the proper point value of the escapement increment is set up and momentarily stored, so to speak, whether it pertains to character width or word spacing, or is involved in justification procedures; and then at the proper instant in the high speed operation, the escapement release is actuated, for example by the energization of a solenoid, to permit the carriage to move the distance commensurate with the value set up.

Although the various sequences necessary in composing a character are measured in such machines in milliseconds, the attainment of still higher speeds of operation is still sought to increase production but at the same time preserve accuracy and reliability. In present machines, the escapement trip means is actuated by direct operative connection with the core or armature of a solenoid or electro-magnet, and the actuation is relatively slow because the speed of operation is dependent upon the duration of the electrical pulse which must be conservatively long for reliability.

The general object of the invention, therefore, is the provision of a novel and improved escapement actuator which affords a faster and more reliable electro-mechanical escapement operation.

In its preferred embodiment, the invention contemplates the provision of a spring retracted slide which carries actuator pins or abutments each associated with one of a cumulative series of selective escapement gear clusters which are operatively connected with the carriage of the composing machine and which are each adapted to contribute its own fractional increment to the escapement movement of the carriage. The selection of one or more of these gear clusters to be tripped and actuated by the slide is effected by a series of escapement magnets which are selectively energized by appropriate circuitry according to the point sizes required for character width, whether upper case or lower case, or for word spacing.

However, instead of connecting an escapement actuating magnet or solenoid directly to the slide, whereby the return of the slide is limited by the return movement of the solenoid core or armature, the present invention provides means whereby a solenoid or other electro-magnet moves the slide to the point necessary to trigger the escapement gearing and then releases the slide for quick return by the action of its restraining spring.

Other objects and features of novelty will be apparent from the following specification when read in connection with the accompanying drawings in which one embodiment of the invention is illustrated by way of example.

In the drawings:

FIGURE 1 is a fragmentary plan view of a portion of a multiple escapement mechanism for a photo-typesetter embodying the principles of the invention;

FIGURE 2 is a view in vertical section taken approximately on line 2-2 of FIGURE 1;

FIGURE 3 is a detail view in vertical section taken on line 3-3 of FIGURE 1;

FIGURE 4 is a plan view of the triggering or actuat-

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ing mechanism for the escapement device of FIGURES 1-3, with the parts in idle position as between actuations;

FIGURE 5 is a similar view showing the displaced positions of the parts at the extreme actuated position of the triggering mechanism; and

FIGURE 6 is a vertical sectional view as taken substantially on line 6-6 of FIGURE 4.

Reference is made to the photo-typesetter disclosed in the applicant's co-pending application Ser. No. 686,233, filed September 25, 1957, Patent No. 3,082,670, granted March 26, 1963, for an example of the escapement mechanism of the type involved here, and further to the equivalent basic mechanism disclosed in Blodgett Patent No. 2,700,447 of January 25, 1955, for an antecedent arrangement. Specific reference is made to FIGURES 14-18 of the Blodgett drawings and to columns 13-15 of the specification. The principles of the present invention are specifically applied to such mechanism for purposes of illustration, but it is obvious that within its broad scope the invention is applicable to a wide variety of escapement systems. FIGURES 1, 2 and 3 of the present application will be recognized as counterpart of FIGURES 38, 38A and 39 of my co-pending application above noted.

With these published disclosures in mind, the basic or fundamental structure of the escapement device need only be briefly described. The general arrangement of the escapement set-up described in the Blodgett patent at the points noted, may be traced to the three escapement magnets designated in Blodgett as EM1, EM2, and EM3, but referred to in my co-pending application and in this present specification as LE1, LE2, and LE3. Of course, as fully described in the references mentioned, the carriage of the machine is continually urged in the direction to progressively imprint a line of text, by means of a tape tensioned by a spring-actuated drum, and such carriages are usually provided with a rack with which meshes a driving gear moved by the escapement mechanism. The several gear clusters which are selectively actuated by means of ratchet wheel and dog devices are clearly disclosed in the Blodgett patent particularly in connection with FIGURES 14-18 therein, and the description, so far as it involves the present invention, will be carried on from the points of departure represented by the escapement ratchet wheel 130', 131' and 132'.

FIGURES 1, 2 and 3 of the present application show certain basic parts which correspond to those illustrated in the Blodgett figures referred to and similar reference numerals will be employed with the addition of primes, in the same manner as effected in my co-pending application.

Thus the general framing is indicated at 127' and comprises a portion 134' and the upper frame plate 197'. The familiar ratchet wheels are shown at 130', 131', and 132'. Other elements to be seen are the loose dog 161', the dog rocker plate 195', its lugs 203', the resilient stops 206' and 207' mounted on the adjustable arms 208' and 209'.

Projecting to the left in FIGURE 1 from beneath the frame plate 197' are portions of the rocker plates 195' comprising the escapement dog carrier assembly. (See also FIGURE 2.) These projecting arms 195' are connected to a part of the fixed frame portion 127' by means of the springs 440 which serve to urge the several rocker assemblies into normal idle association with the escapement ratchet wheels 130', 131', and 132'.

Dog carrier arms 442 also extend from the rocker assemblies into the path of movement of the trip slide member designated generally by the reference numeral 445 and comprising an angle plate having a flange 446 upon which are adjustably mounted the studs 447. The slide member 445 is suitably supported by a portion of the

frame 127', for movement in a direction toward the bottom of FIGURE 1 by the novel mechanism to be described.

When one or more of the escapement magnets LE1, LE2, and LE3 are energized, the corresponding dog carrier arms 442 are depressed and interposed in the path of the corresponding studs 447 of the slide member 445, and the escapement is set for actuation. Then when the triggering or actuating mechanism is energized, as will be described, the trip slide 445 is moved against the resilient resistance of the coil springs 457 which connects a pin 458 on the fixed frame with a pin 459 on the slide, so that the studs 447 contact such dog carrier arms 442 as have been depressed by the selective actuation of the magnets LE1, LE2, or LE3. These dog carriers 442 and the rocker assemblies 195' to which they are connected are thus swung in a direction to effect the appropriate escapement movement of the respective escapement ratchet wheels 130', 131', and 132', by the interaction of the dog and stop elements as clearly described in the Blodgett Patent 2,700,447.

In FIGURE 2 there will also be recognized the linkage (here designated 469) connecting the escapement ratchet with the escapement magnet (LE1), all fully disclosed in the Blodgett patent.

Now the devices described in my co-pending application included the solenoid which was designated in that application by the reference numeral 455 and which through certain crank linkages serves to move the trip slide 445 in the direction to effect the escapement movement of the carriage and then return under the influence of the spring 437 to initial position, but the solenoid armature or core and the connecting linkages involved inertias which perceptibly slowed down the operation of the photo-type-setter machine. However, for purposes of disclosure, it should be mentioned that the solenoid 455 of my co-pending application was designed to be energized at the proper times by circuitry controlled by switches IIIa and IIIb actuated by a cam III as described in that application.

Referring now to FIGURES 4-6 of the drawings, the upper left-hand corner of the escapement assembly shown in the earlier figures of drawings is shown, this fragmentary showing including the slide member 445 which is an angle member having flanges 446 and 448, stop pins 447 projecting from the flange 446 and adapted to strike the dog carrier arms 442 when they are depressed.

The novel actuator mechanism is mounted upon a base plate 10 which is of a general right-angular configuration, the described portions of the basic escapement mechanism nesting within the angle of the plate 10. Upwardly of this mechanism as viewed in FIGURE 4 of the drawings, the plate 10 is provided with a transversely adjustable solenoid carrying plate 12, adjustment of the position of the solenoid 15 carried by the plate 12 being effected by means of the screws 16, 17, and 18 which may be tightened in appropriate notches 19 cut in the plate 12. The solenoid 15 may be appropriately secured to the plate 12 as by means of the fastening elements suggested at 20.

Positioned for reciprocation within the solenoid 15 is the core 22 which may be split as at 23 to receive an end of the link 25 which is attached thereto by means of the pivot pin 26. The other end of the link 25 is pivotally connected with an arm 28 of a T-lever assembly designated generally by the numeral 30, the link and arm being pivotally connected as by means of the screw 32.

The T-lever assembly 30 occupies two planes, the upper arm 28 being raised somewhat from the base plate 10 and the other portion of the lever assembly comprising a long actuating arm 35 and the short spring-connected arm 36 occupying a lower plane close to the plane of the base plate 10.

As shown in FIGURE 6 of the drawings, the arm 28 and the lower arm assembly 35, 36 are secured to the spool 38 which is rotatably mounted upon the pin 40 extending upwardly from the base plate.

The T-lever assembly 30 is urged in the counterclockwise direction as viewed in FIGURES 4 and 5 by means of the spring 42 which is tensioned between the post 43 carried by the base plate 10 and the pin 44 on the short arm 36. Upon the right hand end of the long operating arm 35 there is pivoted the bell crank pawl member 45 as by means of the pivot screw 46. The pawl member 45 has a projection 47 carrying a pin 48 to which one end of the retracting spring 49 is attached, the other end being secured to the pin 50 carried by an intermediate portion of the lever arm 35. A flat boss 52 is formed on the arm 35 which is adapted to abut the stop pin 54 which extends upwardly from the plate 10, in order to limit its retractive counterclockwise movement instigated by the spring 42.

The tooth 55 of the pawl 45 is adapted to abut and contact with a projection 60 secured to one side of the flange 448 of the escapement trip slide 445. This abutment piece 60 has a projection 61 forming a shoulder against which the tooth 55 abuts under the influence of the spring 49 which urges the pawl 45 in a counterclockwise direction and thus tends to position the tooth 55 of the pawl against the shoulder formed by the projection 61. This initial positioning of the device is clearly shown in FIGURE 4 of the drawings, wherein the slide 445 is in its retracted position and the abutment face 52 of the lever arm 35 is urged against the stop pin 54 by the spring 42.

Now upon energizing the solenoid 15 by means of the circuitry described in my co-pending application, the core 22 is drawn to the right as viewed in FIGURES 4 and 5 which swings the T-lever assembly 30 in a clockwise direction against the urging of the spring 42. At this time, of course, the tooth 55 of the pawl member 45 is in contact with the shoulder 61 of the projection 60 on the slide 445 and the action of the solenoid will be to shoot the slide 445 in a direction toward the bottom of FIGURE 4. However, as the lever nears the end of its travel the knob 65 on the tail of the bell crank pawl 45 will strike the face of the adjustable stop piece 66 which is adjustably secured to the plate 10 as by means of the screws 67 and 68 working through appropriate slots in the piece 66. Continued movement of the lever arrangement after the tail 65 of the pawl has struck the abutment 66 will rotate the pawl in a clockwise direction against the urging of the spring 49 and this will move the tooth 55 of the pawl to the left and release it from contact with the shoulder 61 carried by the slide. Immediately the tooth passes beyond the shoulder 61, the return spring 457 (see FIGURE 1) will quickly shoot the slide 445 back toward retracted position or in an upward direction as viewed in FIGURE 4.

In order to prevent undue movement of the escapement trip slide 445 in the downward direction as viewed in FIGURE 5, the trip slide stop member 75 is provided, this member being an angle piece having an arm 76 with a bevelled end adapted to be abutted by the similarly bevelled side of the shoulder portion 61 of the projection 60, and the shank arm 77 of the stop 75 comprising means for adjustably securing it to the base plate 10 as by means of the screws 78 working in slots 79 provided in the member 75.

Thus, it will be seen that the accomplishment of the escapement tripping through the to-and-fro movement of the slide 445 is expedited by permitting the spring-urged return of the slide, instead of waiting for the termination of the pulse energizing the solenoid, and in fact the relatively slow return of the solenoid core to normal position. Also, the relative lengths of the lever arms 28 and 35 indicate that the movement of the pawl tooth 55 will be approximately twice as rapid as the actual movement of the solenoid core.

It is understood that various changes and modifications may be made in the embodiment illustrated and described herein without departing from the scope of the invention as defined by the subjoined claims.

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Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a typographic composing machine which comprises a carriage spring-urged in the direction to progress a receiving medium thereon past an imprinting position, carriage escapement controlling means including means for selectively varying the increments of escapement according to the nature of the characters or spaces involved, and a spring retracted reciprocating escapement trip slide for effecting the carriage escapement: operating means 10 for said trip member comprising an actuator member having a releasable operative connection with said trip slide; electro-magnetic means for moving said actuator member in the same general direction as said trip slide and in proximity thereto, and in the return direction; means for tripping said releasable connection at a point near the end of the movement of said moving means in said first direction, to release the escapement trip slide for quick return under spring retraction.

2. In a typographic composing machine which comprises a carriage spring-urged in the direction to progress a receiving medium thereon past an imprinting position, carriage escapement controlling means and a spring retracted reciprocating escapement trip member for effecting the carriage escapement: operating means for said 20 trip member comprising an actuator member having a releasable operative connection with said trip member; means for moving said actuator member in the same general direction as said trip member and in proximity thereto, and in the return direction; means for tripping 30 said releasable connection at a point near the end of the movement of said moving means in said first direction, to release the escapement trip member for quick return spring retraction.

3. The device as set forth in claim 2 in which said 35 operating means comprises a pivoted lever, and said releasable operative connection comprises a pawl mem-

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ber pivotally connected to said lever and having a tooth for engagement with said slide, and a stationary abutment adapted to be struck by said pawl member to swing it out of engagement with the slide at a predetermined point in its movement.

4. The device as set forth in claim 3 in which said pawl member is in the form of a bell crank pivoted to said lever at its angle portion, the tooth being at the end of one arm and the other arm adapted to strike said abutment.

5. The device as set forth in claim 3 in which an abutment shoulder is provided on said slide for releasable engagement by said tooth, and in which means are provided for adjusting the position of the stationary abutment.

6. The device as set forth in claim 3 in which said pawl member is in the form of a bell crank pivoted to said lever at its angle portion, the tooth being at the end of one arm and the other arm adapted to strike said abutment, and in which an abutment shoulder is provided on said slide for releasable engagement by said tooth and in which means are provided for adjusting the position of the stationary abutment.

7. The device as set forth in claim 6 in which said operating lever is of a generally T-shaped configuration in plan, the pawl member being carried by the end of the upright of the T, a restraining spring connected with one end of the cross bar of the T and the opposite end of the cross bar of the T being connected with the core of a solenoid which comprises the electro-magnet member, and in which an adjustable stop element is disposed in the path of the slide to prevent overrunning in its movement in said first direction.

References Cited in the file of this patent

UNITED STATES PATENTS

2,217,159 Dodge ----- Oct. 8, 1940