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Chida et al.

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[54] **PRINTING MECHANISM AUTOMATICALLY POSITIONABLE IN THE SAME START POSITION**

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[51] **Int. Cl.** **B41j 23/32**

[58] **Field of Search** ..... 101/93 C; 197/18, 48, 49, 197/55; 318/254, 138, 696, 685, 439; 74/527; 310/20

[56] **References Cited**

UNITED STATES PATENTS

3,010,055	11/1961	Nicolaus	310/23
3,332,068	7/1967	McLoughlin et al.	101/93 C X
3,359,474	12/1967	Welch et al.	318/254 X
3,374,410	3/1968	Aronquist et al.	318/254
3,423,658	1/1969	Barvus	318/696
3,500,103	3/1970	Swain et al.	318/254
3,523,230	8/1970	York	318/138 X
3,586,937	6/1971	Holzer	318/696
3,586,953	6/1971	Markkanen	318/685
3,593,096	7/1971	Newell	318/696
3,663,877	5/1972	Clark	318/254

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[57] **ABSTRACT**

A printing mechanism comprises a rotary print drum having around the periphery thereof a series of circumferentially spaced-apart rows of print type, a drive system for electromagnetically rotating the print drum in an intermittent manner to successively position the rows of type in a print position, and a positioning device for automatically positioning the print drum in the same start position each time the printing mechanism is turned ON. The drive system comprises a ratchet wheel connected to the print drum, a pawl engageable with the ratchet wheel, an electromagnet responsive to pulse signals for electromagnetically reciprocating the pawl to effect intermittent rotation of the print drum, and an electric control circuit for successively applying pulse signals to the electromagnet. The positioning device includes a cam connected to the ratchet wheel for intermittent rotation therewith, a lock lever pivotable into camming engagement with the cam, and an electromagnet responsive to a position signal developed by the electric control circuit for pivoting the lock lever into engagement with the cam. The intermittent rotational movement of the ratchet wheel effects a corresponding movement of the cam until the print drum is moved into the start position afterwhich the lock lever coacts with the cam to prevent further movement of the ratchet wheel even though pulse signals may continue to be applied to the drive system electromagnet.

9 Claims, 3 Drawing Figures

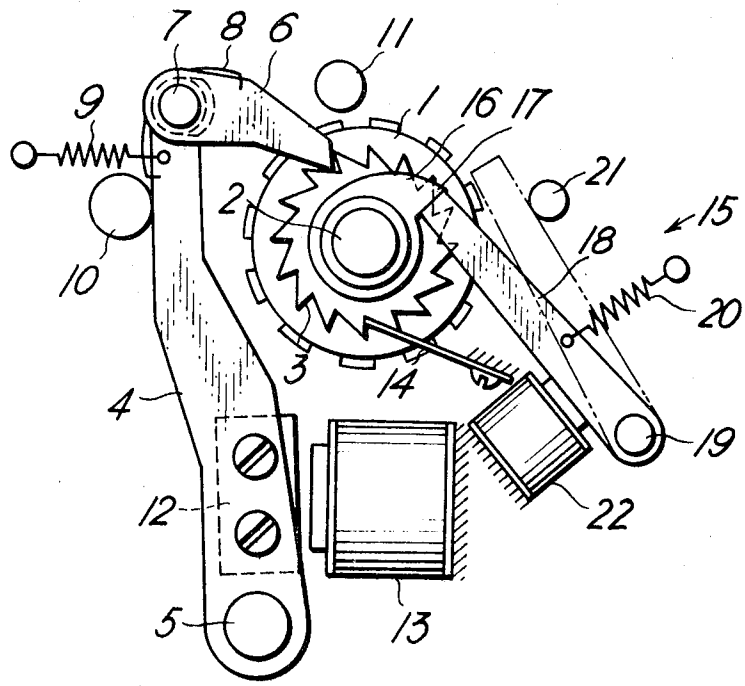


Fig. 1

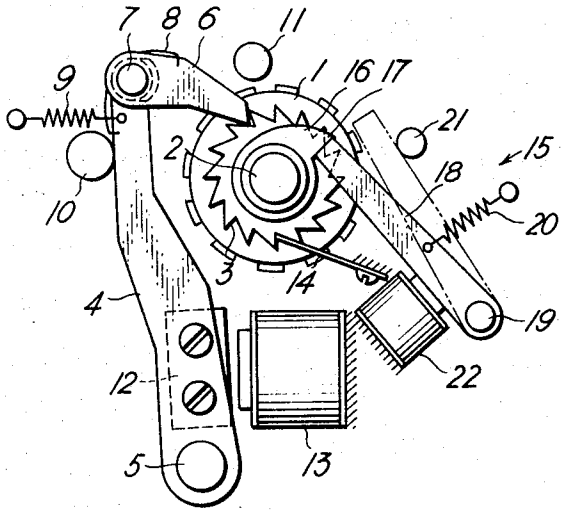


Fig. 2

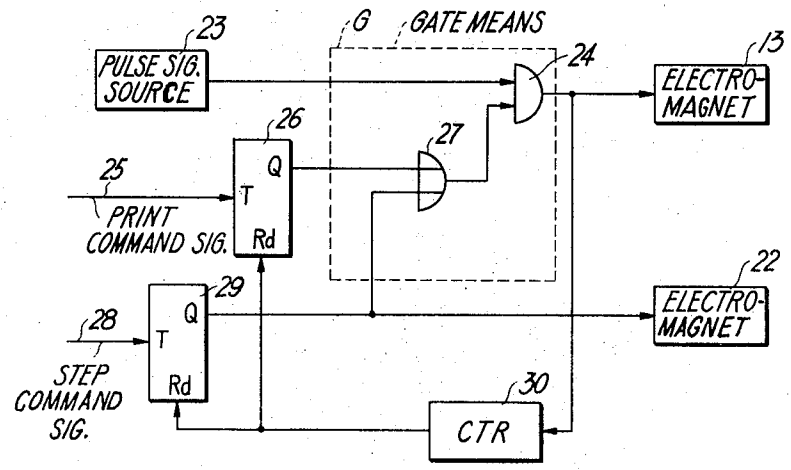
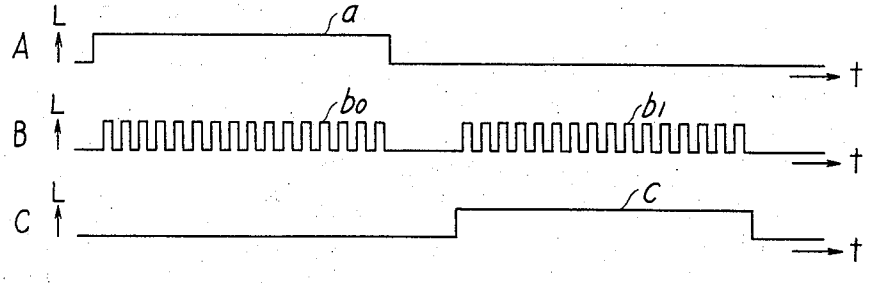


Fig. 3



PRINTING MECHANISM AUTOMATICALLY POSITIONABLE IN THE SAME START POSITION

The present invention relates to a printing mechanism and more particularly to a printing mechanism having a rotary print drum and means for automatically positioning the drum in the same start position each time the printing mechanism is turned ON.

In conventional printing mechanisms, a continuously operating motor is employed as the power source for rotationally driving a rotary print drum. The print drum contains a plurality of rows of print type angularly spaced around the periphery thereof and a print hammer is positioned along the print drum to selectively strike desired ones of the rows of type to effect a printing operation. A paper strip is advanced between the print drum and the print hammers and the motor rotates the print drum either continuously or intermittently to successively position the various rows of type in aligned opposition to the print hammer.

The disadvantage of the prior art printing mechanisms is that the motor does not always stop the print drum in the correct position to resume printing when the mechanism is next started and the motor occupies considerable space within the printing mechanism and thus it is not possible to construct the printing mechanism as a miniature small-sized unit. The motor is an expensive component and consequently the price of the printing mechanism must reflect the cost of the motor. In those printing mechanisms wherein the print drum is continuously rotated, an angle detecting device is necessary in order to detect the angular position of the print drum to effect actuation of the print hammer in synchronization with the rotation of the print drum. The angle detecting devices heretofore employed are complex structures requiring precise manufacturing accuracy, frequent maintainence and adjustment, and therefore require much labor and expense.

In the printing mechanisms wherein the print drum is intermittently rotated, some type of mechanical lost-motion device must be coupled to the motor in order to convert the continuous rotation of the motor output shaft into an intermittent rotation to intermittently drive the print drum. Thus a Geneva mechanism or other similarly functioning mechanism must be included within the printing mechanism and such renders the mechanism more complex and expensive. Moreover, some device must be provided for coordinating the intermittent motion of the print drum with the actuation of the print hammer.

It is therefore a primary object of the present invention to provide a printing mechanism which is small-sized, inexpensive to manufacture, reliable in operation, high in printing accuracy, and which is suitable for use in a desk-type electronic calculator, a measuring instrument, or a terminal device of a communication machine.

It is another object of the present invention to provide a printing mechanism having means for automatically positioning the print drum in the same start position to effect a printing operation each time the mechanism is turned ON irregardless of the position of the print drum when the mechanism is turned OFF.

It is still further object of the present invention to provide a printing mechanism utilizing an electromagnetically driven ratchet wheel as the power source instead of a motor therefore simplifying the structural composition of the mechanism.

The above and other objects of the present invention are carried out by a printing mechanism composed of a print drum having around the periphery thereof a set of circumferentially spaced-apart rows of print type, drive means for rotationally driving the print drum in an intermittent manner to successively position the rows of print type in a print position, positioning means coacting with the drive means for positioning the print drum in the same start position each time the mechanism is turned ON, and an electric control circuit for controlling the actuation of the drive means and the positioning means. The drive means comprises a ratchet wheel connected to the print drum, a pawl in engagement with the ratchet wheel, and an electromagnet for reciprocally driving the pawl to effect intermittent rotational movement of the ratchet wheel whereas the positioning means comprises a cam connected to the print drum, a lock lever engageable with the cam to releasably lock the print drum in its start position once the print drum is moved into the start position by the drive means, and an electromagnet for pivoting the lock lever into camming engagement with the cam.

Having in mind the above and other objects that will be evident from an understanding of the disclosure, the present invention comprises the combination and arrangement of parts illustrated in the presently preferred embodiments of the invention which are hereinafter set forth in sufficient detail to enable those persons killed in the art to clearly understand the function, operation, construction, and advantages of them when read in conjunction with the accompanying drawings, wherein like reference characters denote like parts in the various views, and wherein:

FIG. **1** is an elevational perspective view of the mechanical components of the printing mechanism according to the present invention;

FIG. **2** is a block diagram of an electric control circuit for controlling the actuation of the printing mechanism shown in FIG. **1**; and

FIG. **3** is a series of waveforms of certain signals developed in the circuitry of FIG. **2**.

One embodiment of a printing mechanism constructed according to the principles of the invention is shown in FIG. **1** and comprises a type-carrying member in the form of a print drum **1** mounted on a rotary shaft **2**. The periphery of the print drum **1** is divided into n number of equal circumferentially spaced-apart segments and a set of print type extends longitudinally along the length of the drum in each segment. In the present embodiment, the *n* number of sets of print type comprises sixteen rows of print type and thus the print drum is provided with 16 angularly spaced-apart rows of type and may effect the printing of 16 separate and distinct bits information depending upon the angular position of the print drum.

The printing mechanism also includes a print hammer (not shown in the drawings) arranged along the print drum in parallel therewith and mounted for pivotal movement towards and way from the print drum **1**. The print hammer has a hammer head for striking individual ones of the types disposed along any one of the rows of type on the print drum **1** to effect a printing operation. The print drum is intermittently rotated by driving means which will be described hereinafter to intermittently position successive rows of type in a

common print position wherein the rows of type are in opposition to the print hammer whereby the print hammer may be actuated to strike the desired row of type.

A paper strip is intermittently advanced between the print hammer and the print drum and the information contained on the desired row of type is printed on the paper strip by the coaction of the hammer head striking the row of type with the paper strip contained therebetween. It is understood that the paper strip is advanced in synchronization with the rotation of the print drum 1 and thus any of the sixteen rows of type may be printed on each successive line of print of the paper strip. The mechanisms for advancing the paper strip and actuating the print hammer are known in the art and do not constitute part of the present invention and therefore will not be further described.

The driving means for intermittently driving the print drum in angular increments comprises a ratchet wheel 3 connected to one end of the shaft 2 and having around the periphery thereof sixteen similarly dimensioned ratchet teeth. A drive lever 4 is mounted for pivotal movement about a pin 5 affixed to a frame portion of the printing mechanism. A pawl 6 is pivotally mounted on the distal end of the drive lever 4 by means of a pin 7. The pawl 6 is biased into constant contact with a tooth of the ratchet wheel by a biasing spring 3 and another biasing spring 9 continuously urges the drive lever 4 to an initial limit position wherein the tip of the pawl 6 rests upon a flank portion of one of the ratchet teeth as shown in FIG. 1.

A stop member 10 defines the initial limit position of the drive lever 4 wherein the drive lever abuts against the stop member 10 and is maintained thereagainst by the biasing spring 9. Another stop member 11 defines the terminal limit position of the drive lever 4 wherein the stop member 11 abuts against a surface portion of the pawl 6 to limit the extent of clockwise movement of the drive lever 4 effected by the actuating means described below. Thus it may be seen that the drive lever 4 is mounted for pivotal movement between two limit positions defined by the stop members 10 and 11. A detent lever 14 successively engages with each ratchet tooth to maintain the ratchet wheel in its advanced position.

Actuating means 12, 13 effects reciprocal pivotal movement of the drive lever 4 between the two limit positions. The actuating means comprises an armature 12 affixed to the drive lever 4 at a location adjacent the pin 5 and an electromagnet 13 affixed to a frame portion of the printing mechanism in opposed relationship from the armature 12. When the electromagnet 13 is energized, a magnetic field is created therearound which coacts with the armature 12 to attract the armature 12 towards the electromagnet thereby pivoting the drive lever 4 in a clockwise direction. The gap spacing between the armature 12 and the electromagnet 13 is suitably chosen in relation to the pitch of each two adjoining ratchet teeth such that movement of the drive lever from the initial limit position shown in FIG. 1 to the terminal limit position whereby the pawl 6 abuts against the stop member 11 causes the pawl 6 to angularly advance the ratchet wheel 3 a distance equal to one ratchet tooth thereby advancing the print drum one/sixteenth of a revolution. When the electromagnet 13 is deenergized, the magnetic field collapses and the force of attraction between the armature 12 and the electromagnet terminates afterwhich the biasing spring 9 urges the drive lever 4 in a counterclockwise direction back to the initial limit position.

Positioning means 15 coacts with the driving means for positioning print drum 1 at a predetermined start position. The positioning means functions to permit angular incremental movement of the ratchet wheel 3 by the driving means until same reaches a predetermined angular start position and then momentarily locks the ratchet wheel in this start position. The positioning means comprises a cam 16 connected to the shaft 2 for movement therewith and the cam is profiled as shown in FIG. 1 to have an arcuate camming surface and a diametrical locking surface 17. A lock lever 18 is pivotally mounted on a pin 19 for pivotal movement into and out of engagement with the cam 16. A biasing spring 20 urges the lock lever 18 in a clockwise direction to the position shown by phantom lines wherein the lock lever abuts against a stop lever 21. The lock lever 18 is pivoted in a counterclockwise direction against the force of the biasing spring by an electromagnet 22 to effect camming engagement of the lock lever 18 with the cam 16.

The electromagnet 22 is selectively energized by a position control signal in a manner described hereinafter to attract the lock lever 18 into camming engagement with the cam 16 so that during intermittent angular movement of the print drum 1 in a clockwise direction, the locking surface 17 of the cam will move into engagement with the tip of the lock lever 18 as shown in solid lines in FIG. 1. This positions defines the predetermined angular position wherein the print drum is to be positioned and comprises the start position of the print cycle wherein the print drum 1 is in position to undergo intermittent rotation through sixteen angular increments to successively position each row of type in the print position during one revolution of the print drum 1. If for any reason the printing mechanism is turned OFF thereby terminating the power supply to the printing mechanism, the positioning means will automatically ensure that the print drum 1 is placed in the start position before the next printing operation is carried out. Thus the positioning means effectively prevents erroneous printing or misprinting by positioning the print drum 1 in the same start position each time the printing mechanism is turned ON.

FIG. 2 discloses a block diagram of the control circuitry for effecting intermittent rotation of the print drum 1 and for actuating the positioning means 15. A pulse signal source 23 supplies a continuous train of pulse signals to a gate means G. The pulse signal source 23 may comprise a free-running multivibrator, a monostable multivibrator triggered by an external signal, or a Schmitt circuit triggered by a standard AC signal obtained from a commercial power line. The gate means G selectively gates and blocks the pulse signals to and from the electromagnet 13 to effect successive energization of the electromagnet to intermittently rotate the print drum 1.

The gate means G comprises an AND gate 24 having two inputs and one output. One input of the AND gate 24 receives the continuous train of pulse signals from the pulse signal source 23 and delivers them to the output only when a gate signal is applied to the other input and the waveform of the output signal from the AND gate 24 is depicted in FIG. 3B. An OR gate 27 provides the gate signal to the AND gate 24 in response to either

an output signal from a flip-flop circuit **26** or an output signal from a flip-flop circuit **29**.

The flip-flop circuit **26** has a trigger input T for receiving a print command signal **25**, a reset input Rd, and an output Q which is connected to the OR gate **27**. The flip-flop circuit **26** has a set state and a reset state and when the circuit is in the set state, an output signal is produced at the output Q and when the circuit is in the reset state, no output signal is produced at the output Q. The waveform of the output signal *c* from the flip-flop circuit **26** is shown in FIG. 3C.

The flip-flop circuit **29** is similar in construction to the flip-flop circuit **26** and has a trigger input T for receiving a step command signal or power switch signal **28**, a reset input Rd, and an output Q connected to the other input of the OR gate **27** as well as to the electromagnet **22**. The flip-flop circuit **29** has a set state wherein an output signal is produced at the output Q and a reset state wherein no output signal is produced at the output Q and the waveform of the output signal *a* is shown in FIG. 3A.

A counter **30** is connected to receive the pulse signals from the output of the AND gate **24** and the counter counts sixteen pulse signals and then delivers a reset signal to both the reset input Rd of the flip-flop circuit **26** as well as to the reset input terminal Rd of the flip-flop circuit **29**. This reset signal resets each of the flip-flop circuits in their reset state in readiness to receive another trigger input signal.

During operation of the printing mechanism, the power switch is turned ON and electrical energy is supplied to the mechanism. When the power switch is turned ON, a power switch signal or first command signal **28** is applied to the trigger input T of the flip-flop circuit **29** causing an output signal *a* to be produced from the output Q. The output signal *a* is applied simultaneously as a gate signal to the OR gate **27** which in turn delivers the gate signal to the AND gate **24** to place same in its gating mode and as a position control signal to the electromagnet **22** to energize the electromagnet to actuate the positioning means so that the lock lever **18** is moved into camming engagement with the cam **16**.

Assuming first the case wherein the printing mechanism has been shut OFF at a time when the components are in the state shown in FIG. **1**, which corresponds to the correct position for starting a printing cycle, the operation of the mechanism is as follows: when the printing mechanism is turned ON, a step or command signal **28** is applied to the flip-flop circuit **29** to flip same to its set state causing an output signal *a* to be produced at the output Q. The output signal *a* is applied as a gate signal through the OR gate **27** to the AND gate **24** and the output signal *a* is coincidently applied as a position control signal to the electromagnet **22**. The position control signal effects energization of the electromagnet **22** thereby pivoting the lock lever **18** into the position shown in FIG. **1** wherein the end tip of the lock lever engages with the locking surface **17** of the cam **16**.

In this condition, energization of the electromagnet **13** by the pulse signals *bo* is ineffective to rotationally drive the ratchet wheel **3** and hence the print drum **1** remains in the start position shown. As aforementioned, the AND gate **24** is placed in its gating state at the same time the electromagnet **22** is energized and therefore the train of pulse signals delivered by the pulse signal source **23** is gated to the electromagnet **13** to successively energize same. Each pulse signal *bo* delivered from the AND gate **24** is counted by the counter **30** and when the counter counts sixteen pulse signals, the counter delivers a reset signal to the reset terminal Rd of the flip-flop circuit **29** to shift the circuit into its reset state thereby terminating the output signal *a* from the output Q.

During the application of each pulse signal *bo* to the electromagnet **13**, the electromagnet is momentarily energized to develop therearound a magnetic field which coacts with the armature **12** and tends to pivot the drive lever **4** in a clockwise direction to advance the ratchet wheel **3** by one pitch. However, the ratchet wheel **3** is releasably locked in position by the lock lever **18** and therefore each of the sixteen pulse signals in ineffective to advance the ratchet wheel **3**. After sixteen pulse signals have been counted, the electromagnet **22** is deenergized and the biasing spring **20** urges the lock lever **18** out of engagement with the cam **16** and into abutment with the stop member **2**.

Now assuming the other case wherein the printing mechanism has been stopped in a position other than the start position shown in FIG. **1**, the mechanism operates as follows: the turning ON of the printing mechanism supplies a step command or first command signal **28** to the flip-flop circuit **29** whereupon an output signal *a* is also simultaneously applied as a position control signal to the electromagnet **22** to energize same. In this distance, however, the locking surface **17** is not aligned with the end tip of the lock lever **18** and therefore the lock lever **18** is moved into camming engagement with the arcuate camming surface of the cam **16**.

In this state, the pulse signals *bo* applied from the AND gate **24** to the electromagnet **13** will be effective to angularly advance the ratchet wheel **3** one pitch per pulse signal until the ratchet wheel **3** rotates into the start position shown in FIG. **1** wherein the locking surface **17** engages with the lock lever **18**. For example, if the printing mechanism is turned ON and the ratchet wheel **3** is five pitches or five ratchet teeth away from the position shown in FIG. **1**, the first five pulse signals applied to the electromagnet **13** will effect intermittent rotation of the ratchet wheel **3** through five angular increments and thereafter, the pulse signals will be ineffective to rotationally drive the ratchet wheel.

Each pulse signal *bo* delivered from the AND gate **24** is counted by the counter **30** and after the counter counts sixteen pulse signals, the counter delivers a reset signal to the reset terminal Rd of the flip-flop circuit **29**. The reset signal shifts the flip-flop circuit into its reset state to terminate the output signal *a* which was delivered from the output Q thereby simultaneously placing the AND gate **24** in its blocking state and deenergizing the electromagnet **22**. In the example given, the first five output pulses *bo* from the AND gate **24** effect movement of the ratchet wheel **3** whereas the next 11 output pulses *bo* are ineffective to advance the ratchet wheel **3** and after receipt of these sixteen pulse signals, the counter **30** resets the flip-flop circuit **29** and the printing mechanism is ready to commence printing.

It is understood that the above-mentioned sequence of events takes place almost instantaneously and is completed within the time duration of sixteen pulse signals. Now the printing mechanism is in condition to effect a printing operation and such is accomplished by applying a print command or second command signal **25** to the flip-flop circuit **26**. The flip-flop circuit **26** re-

sponds to the print command signal and delivers an output signal *c* from the output Q and applies this output signal through the OR gate **27** as a gate signal to the AND gate **24.** The gate signal places the AND gate **24** in its gating state wherein same gates the succession of pulse signals *b*1 from the pulse signal source **23** to the electromagnet **13.** Each pulse signal applied to the electromagnet **13** effects angular displacement of the ratchet wheel **3** one pitch thereby moving the print drum one one increment.

The counter **30** counts 16 pulse signals *b*1 from the AND gate **24** and then delivers a reset signal to the reset input R*d* of the flip-flop circuit **26** to reset the circuit in its reset state in readiness to receive another print command signal. Thus, in one printing cycle, a print command signal **25** is applied to the trigger input T of the flip-flop circuit **26** to trigger same to its set state wherein an output signal is delivered from the output Q and applied through the OR gate **27** to the AND ate **24** to place the latter in its gating state to gate the pulse signals to the electromagnet **13.** The pulse signals fed to the electromagnet **13** are also applied to the counter **30** and the counter then counts the sixteen pulse signals and applies a reset signal to the flip-flop circuit **26** to reset same into its reset state wherein no output signal is delivered from the output Q.

The ratchet wheel **3** is thus rotationally driven in an intermittent manner to angularly displace the print drum **1** through 16 angular increments per revolution. During the time that any one of the 16 rows of print type is at rest in the print position wherein same is aligned opposite the hammer head, the hammer head is actuated to strike the desired row of type to effect a printing operation.

In accordance with the present invention, the print drum **1** is positioned in the same start position each time the printing mechanism is turned ON thereby ensuring that the correct information is printed during the printing operation. In the event the print drum **1** is manually rotated during the time the power switch is turned ON, suitable means may be provided to energize the electromagnet **22** to ensure that the print drum **1** is in the start position before the next print command signal is applied.

What we claim is:

1. A printing mechanism comprising: a rotatable print drum containing around the periphery thereof *n* circumferentially spaced-apart rows of print type; drive means responsive to a succession of pulse signals for angularly driving said print drum in an intermittent manner through a succession of angular increments each effected by one pulse signal, said drive means comprising a ratchet wheel, means connecting said ratchet wheel to said print drum to effect intermittent angular movement of said print drum in response to intermittent stepwise rotation of said ratchet wheel, and means including an electromagnet responsive to pulse signals applied thereto to electromagnetically effect intermittent stepwise rotation of said rathcet; positioning means responsive to position control signals and coacting with said drive means to effect positioning of said print drum in the same predetermined angular start position in response to each position control signal thereby ensuring that said print drum commences each rotational cycle of operation from the same start position, said positioning means comprising means for permitting intermittent angular movement of said ratchet wheel until said ratchet wheel positions said print drum in said predetermined angular start position and thereafter preventing further angular movement of said ratchet wheel despite further application of pulse signals to said electromagnet until a predetermined number of pulse signals have been applied to said electromagnet; and a control circuit having means responsive to a first command signal for developing a succession of pulse signals and applying same to said electromagnet while simultaneously developing a position control signal and applying same to said positioning means to effect intermittent angular movement of said print drum until same is positioned in said predetermined angular start position, and having means operable after movement of said print drum to said start position and in response to second command signals for developing, for each second command signal, a succession of n pulse signals and applying same to said electromagnet to effect intermittent angular movement of said print drum from said start position through *n* angular increments back to said start position thereby driving said print drum through one rotational cycle.

2. A printing mechanism according to claim **1;** wherein said control circuit comprises counting means for counting the number of pulse signals applied to said drive means and developing an output signal after counting a prescribed number of pulse signals, gate means receptive of a continuous train of pulse signals and having a gating state wherein same gates the pulse signals to said drive means in response to a gate signal and a blocking state wherein same blocks the application of pulse signals to said drive means in the absence of a gate signal, a first flip-flop circuit operative in one stable state wherein same delivers an output signal applied simultaneously to said gate means as a gate signal and to said positioning means as a position control signal in response to said first command signal and another stable state wherein same delivers no output signal in response to said output signal from said counting means, and a second flip-flop circuit operative in one stable state wherein same delivers an output gate signal to said gate means in response to said second command signal and another stable state wherein same delivers no output gate signal in response to said output signal from said counting means.

3. A printing mechanism according to claim **1;** wherein said positioning means comprises a cam connected to rotate with said ratchet wheel and having thereon a locking surface, a pivotally mounted lock lever pivotal into and out of camming engagement with said cam and cooperative with said locking surface when in camming engagement therewith to releasably lock said cam and therefore said ratchet wheel in a position wherein said print drum is in said predetermined angular start position, biasing means for biasing said lock lever out of engagement with said cam, and an electromagnet responsive to said position control signal for electromagnetically pivoting said lock lever into camming engagement with said cam.

4. A printing mechanism according to claim **2;** wherein said plurality of sets of print type comprise n number of circumferentially spaced-apart and longitudinally extending rows of print type.

5. A printing mechanism according to claim **1;** wherein said control circuit comprises an AND gate receptive of a continuous train of pulse signals and operative to gate same to said drive means in response to and

during the presence of a gate signal and operative to block the application of pulse signals during the absence of a gate signal, counting means for counting the number of pulse signals gated by said AND gate and developing a reset signal after counting a prescribed number of pulse signals, and wherein said means responsive to a first command signal includes means operative in one state in response to said first command signal for simultaneously developing a gate signal and applying same to said AND gate while developing said position control signal and applying same to said positioning means and operative in another state in response to said reset signal to simultaneously terminate said gate signal and position control signal, and wherein said means responsive to a second command signal includes means operative in one state in response to said second command signal for developing a gate signal and applying same to said AND gate and operative in another state in response to said reset signal to terminate said gate signal.

6. A printing mechanism according to claim **5**; wherein said positioning means includes means for permitting angular movement of said print drum by said drive means until said print drum reaches said predetermined angular start position and thereafter rendering said drive means ineffective to drive said print drum until termination of said position control signal.

7. A printing mechanism according to claim **6**; wherein said means for rendering said drive means ineffective to drive said print drum comprises means operative when said print drum has moved into said predetermined angular start position for releasably locking same therein until termination of said position control signal.

8. A printing mechanism according to claim **1**; wherein said control circuit comprises an AND gate receptive of a continuous train of pulse signals and operative to gate same to said drive means in response to and during the presence of a gate signal and operative to block the application of pulse signals during the absence of a gate signal, counting means for counting the number of pulse signals gated by said AND gate and developing a reset signal after counting a prescribed number of pulse signals, and wherein said means responsive to a first command signal includes means operative in one state in response to said first command signal for simultaneously developing a gate signal and applying same to said AND gate while developing said position control signal and applying same to said positioning means and operative in another state in response to said reset signal to simultaneously terminate said gate signal and position control signal, and wherein said means responsive to a second command signal includes means operative in one state in response to said second command signal for developing a gate signal and applying same to said AND gate and operative in another state in response to said reset signal to terminate said gate signal.

9. A printing mechanism according to claim **3**; wherein said control circuit comprises an AND gate receptive of a continuous train of pulse signals and operative to gate same to said drive means in response to and during the presence of a gate signal and operative to block the application of pulse signals during the absence of a gate signal, counting means for counting the number of pulse signals gated by said AND gate and developing a reset signal after counting a prescribed number of pulse signals, and wherein said means responsive to a first command signal includes means operative in one state in response to said first command signal for simultaneously developing a gate signal and applying same to said AND gate while developing said position control signal and applying same to said positioning means and operative in another state in response to said reset signal to simultaneously terminate said gate signal and position control signal, and wherein said means responsive to a second command signal includes means operative in one state in response to said second command signal for developing a gate signal and applying same to said AND gate and operative in another state in response to said reset signal to terminate said gate signal.

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