Dec. 31, 1957 C. A. CHRISTOFF ET AL 2,818,018

TYPE WHEEL SELECTING AND PRINT ACTUATING MEANS

Filed July 5, 1955 4 Sheets-Sheet 1

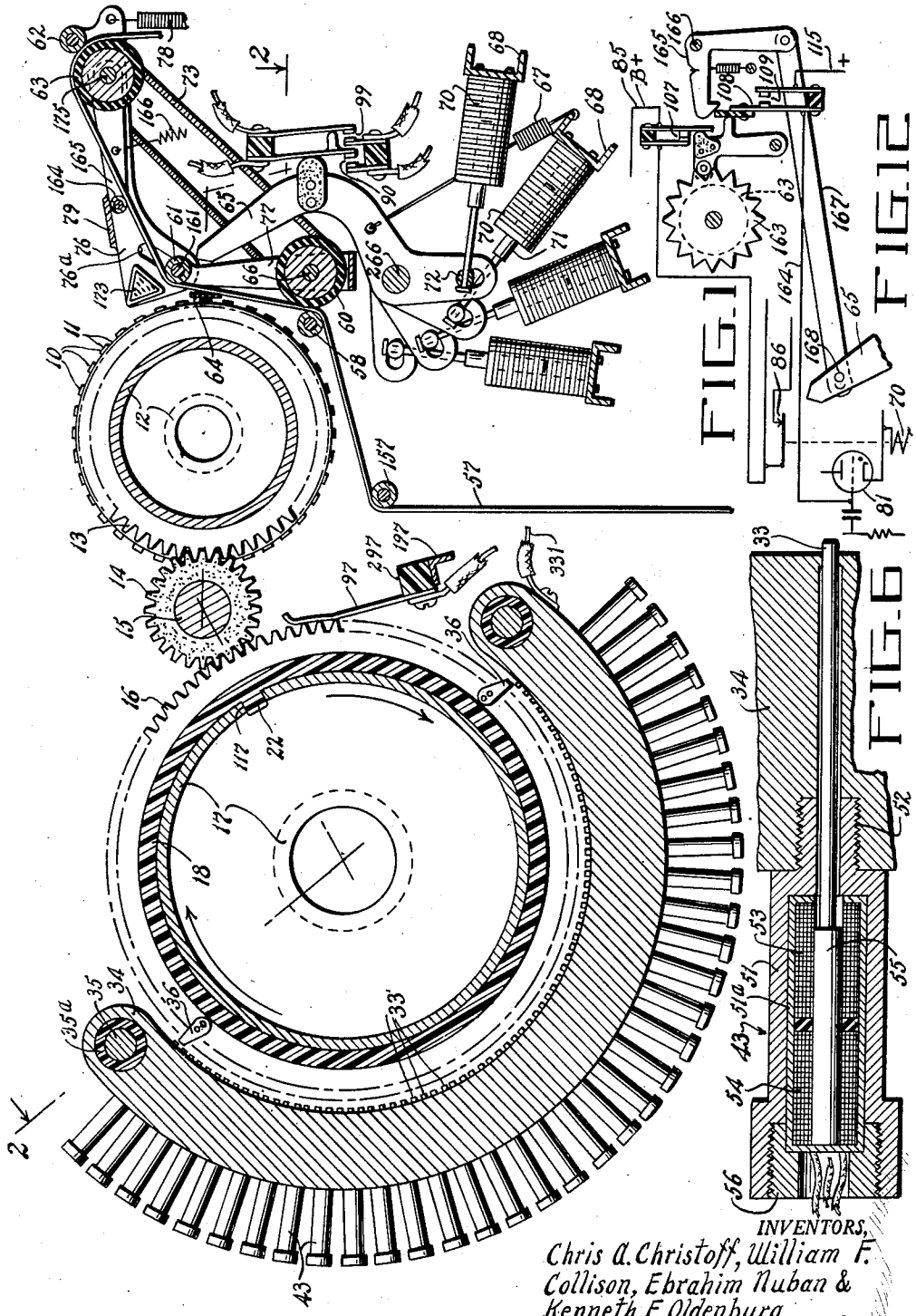


FIG. 1

FIG. 12

FIG. 6

INVENTORS,
Chris A. Christoff, William F. Collison, Ebrahim Nuban & Kenneth F. Oldenburg
Fred N. Schwarz
ATTORNEY.

Dec. 31, 1957 C. A. CHRISTOFF ET AL 2,818,018

TYPE WHEEL SELECTING AND PRINT ACTUATING MEANS

Filed July 5, 1955 4 Sheets-Sheet 2

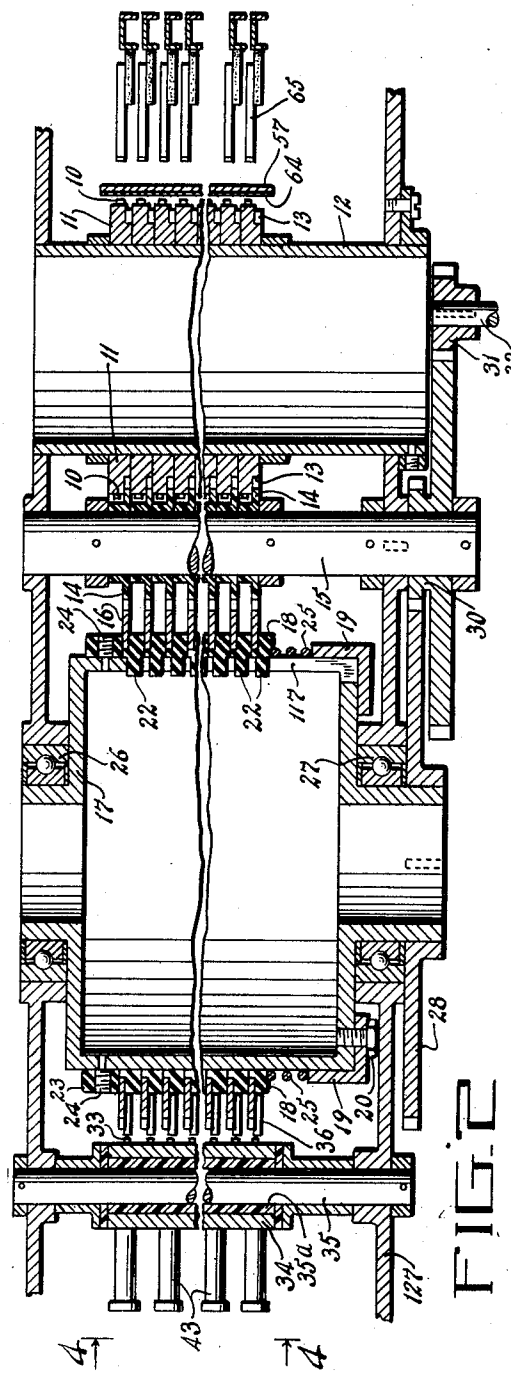


FIG. 2

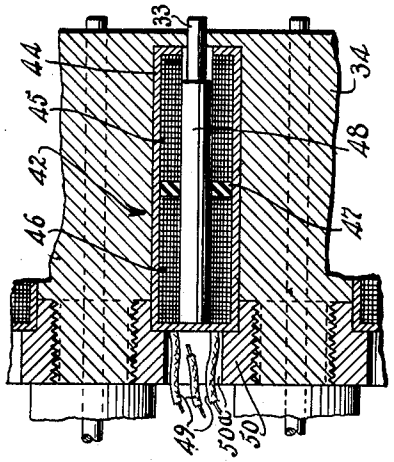


FIG. 5

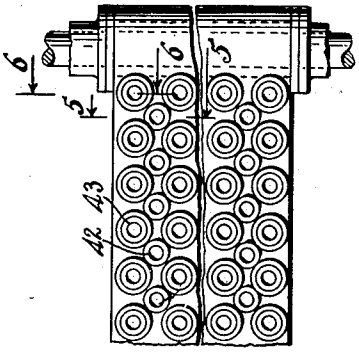


FIG. 4

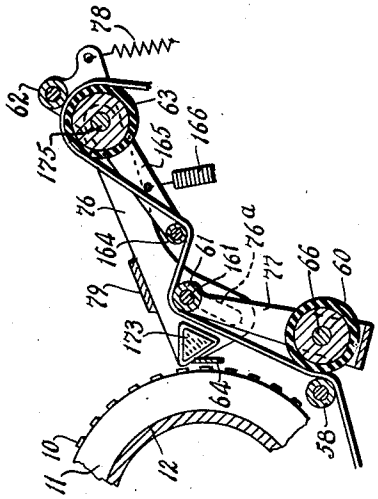


FIG. 7

INVENTORS,
Chris A. Christoff, William F. Collison, Ebrahim Nuban & Kenneth F. Oldenburg

Fred N. Schwend
ATTORNEY.

Dec. 31, 1957 C. A. CHRISTOFF ET AL 2,818,018

TYPE WHEEL SELECTING AND PRINT ACTUATING MEANS

Filed July 5, 1955 4 Sheets-Sheet 3

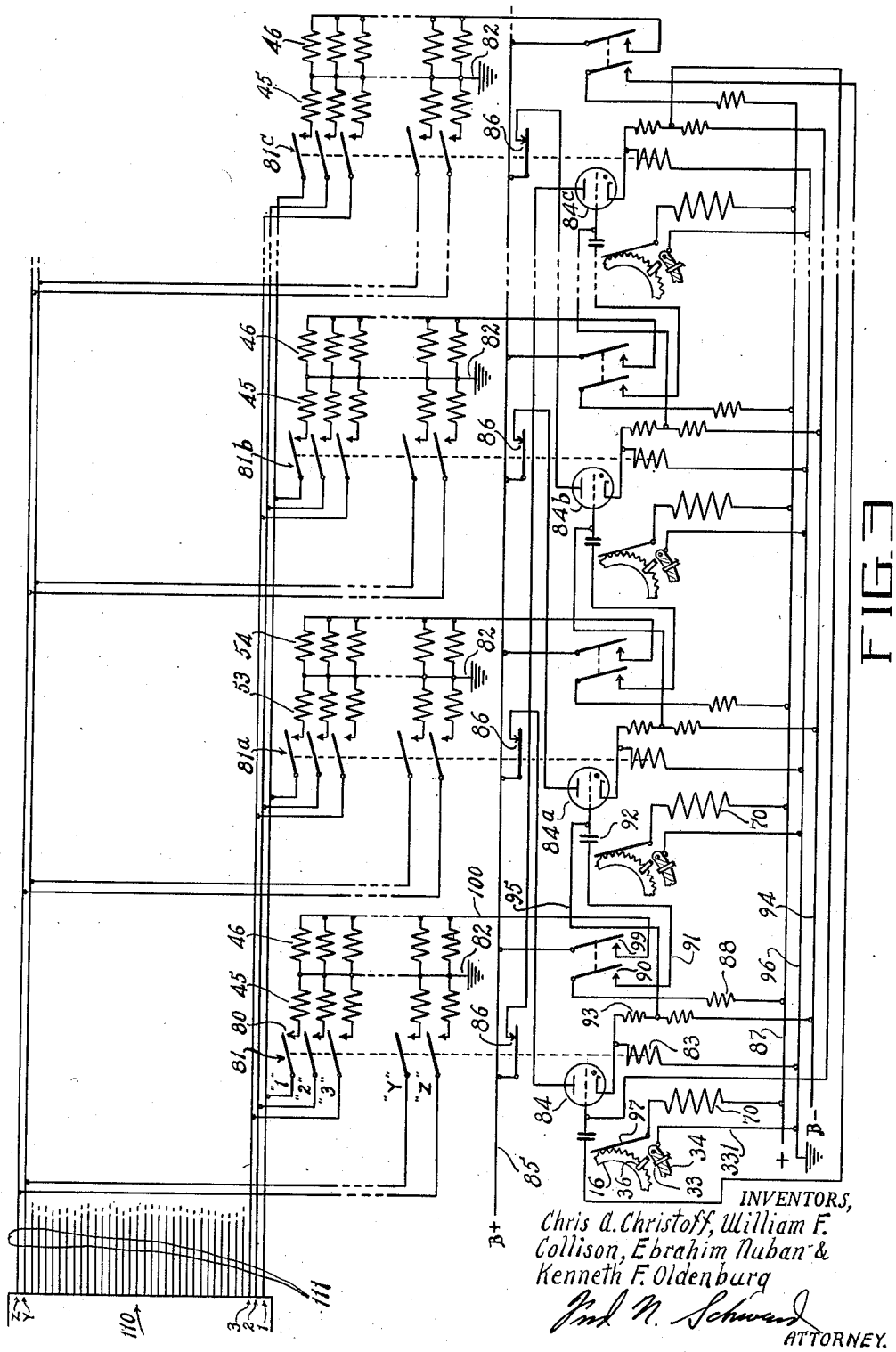


FIG. 3

Dec. 31, 1957 C. A. CHRISTOFF ET AL 2,818,018

TYPE WHEEL SELECTING AND PRINT ACTUATING MEANS

Filed July 5, 1955 4 Sheets-Sheet 4

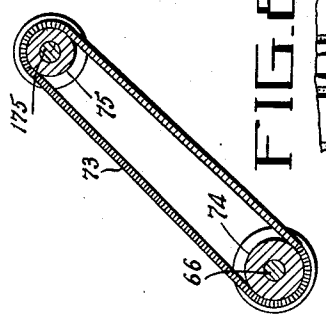


FIG. 8

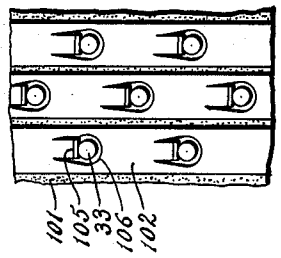


FIG. 11

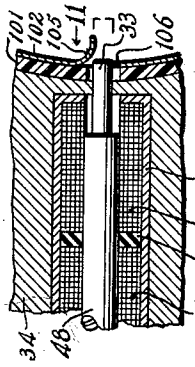


FIG. 10

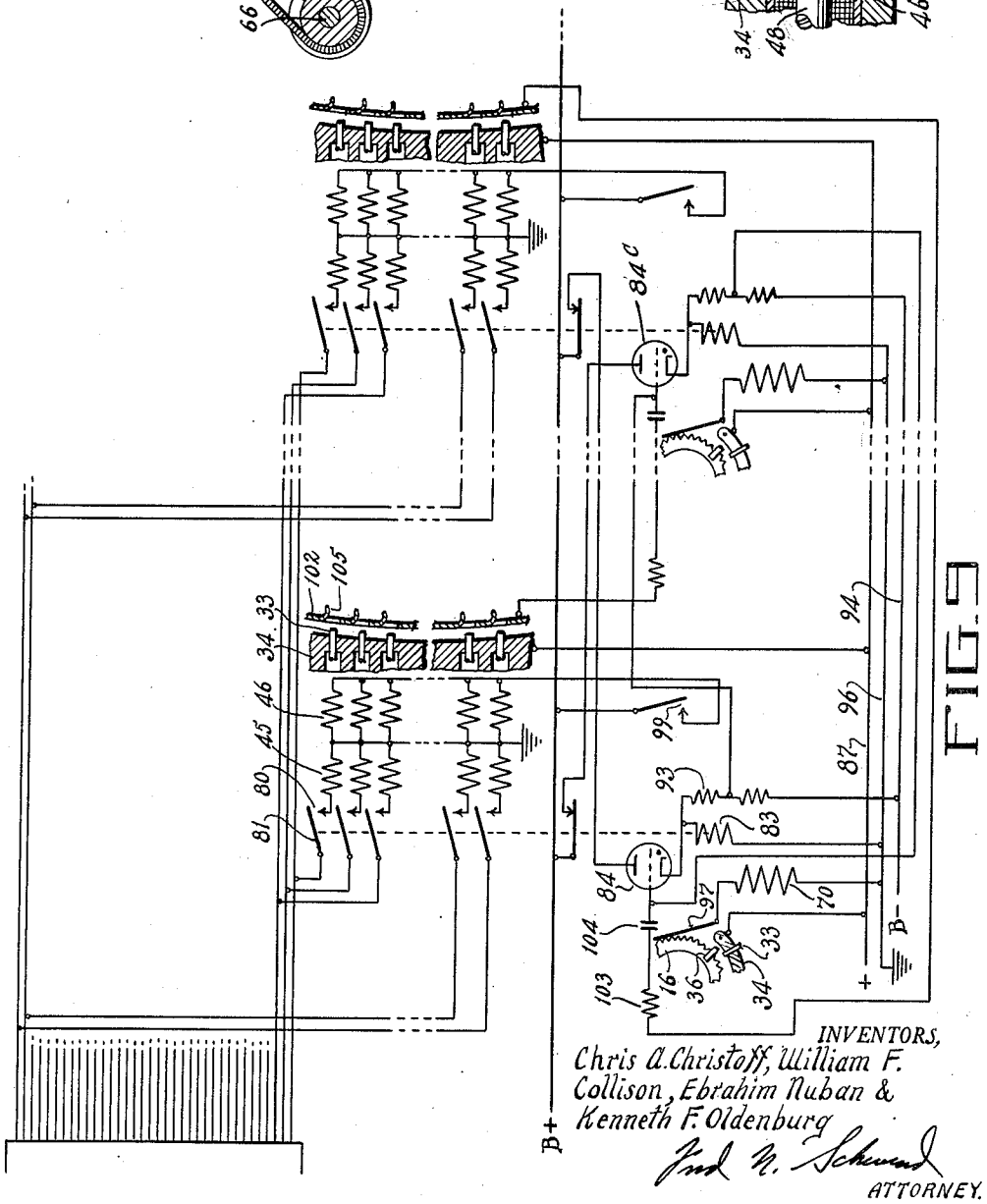


FIG. 5

INVENTORS,
Chris A. Christoff, William F. Collison, Ebrahim Nuban & Kenneth F. Oldenburg

Fred M. Schmund
ATTORNEY.

United States Patent Office 2,818,018
Patented Dec. 31, 1957

2,818,018

TYPE WHEEL SELECTING AND PRINT ACTUATING MEANS

Chris A. Christoff, San Gabriel, William F. Collison, Pasadena, Ebrahim Nuban, Los Angeles, and Kenneth F. Oldenburg, Monterey Park, Calif., assignors to Clary Corporation, San Gabriel, Calif., a corporation of California

Application July 5, 1955, Serial No. 519,742

10 Claims. (Cl. 101—93)

This invention relates to printing devices of the high speed type and has particular reference to electrically controlled high speed printing devices in which a plurality of type wheels, arranged in side-by-side relation, are utilized to print data.

High speed printing devices of the above type have heretofore generally comprised continuously rotating type wheels in which either the type wheels or printing platen is moved, one toward the other, when a selected type character reaches the printing line. This construction presents a very critical timing problem since the slightest changes in timing due to varying time constants or the like in an electrical or electronic control circuit, or in irregularities in the mechanical drive instrumentalities, may result in partial or complete displacement of the type characters, or even printing of the wrong characters.

A primary object of the present invention is to overcome the above noted defects in high speed printers of the printing wheel type.

Another object is to provide a type wheel printer in which a printing operation by a selected type wheel is effected immediately upon arresting of the wheel in selected type printing position.

The manner in which the above and other objects of the invention are accomplished will be readily understood on reference to the folowing specification when read in conjunction with the accompanying drawings, wherein:

Fig. 1 is a longitudinal sectional view of a high speed printing device embodying the present invention.

Fig. 2 is a sectional plan view of the device and is taken substantially along line 2—2 of Fig. 1.

Fig. 3 is a schematic view illustrating the control circuit for the printer.

Fig. 4 is a fragmentary elevational view as seen from line 4—4 of Fig. 2, illustrating the spacial arrangement of the various stop solenoids.

Fig. 5 is an enlarged sectional view of one of the stop solenoid units and is taken along the line 5—5 of Fig. 4.

Fig. 6 is an enlarged sectional view through another of the stop solenoid units and is taken along the line 6—6 of Fig. 4.

Fig. 7 is a sectional view illustrating the printed line viewing mechanism in position to view a printed line on the paper tape.

Fig. 8 is a sectional view illustrating the drive connections between the paper feeding rolls.

Fig. 9 is a schematic view illustrating the control circuits for a modified form of the invention.

Fig. 10 is an enlarged sectional view of a solenoid similar to Fig. 5, but illustrating its parts as embodied in the modified form of the invention.

Fig. 11 is an elevational view taken in the direction of the arrow 11 of Fig. 10.

Fig. 12 illustrates a modified control circuit for causing a predetermined type wheel to print following each advancement of the paper tape.

Referring in particular to Figs. 1 and 2, the printer comprises a plurality of type wheels 11, each having a series of

printing type characters 10 equally spaced about its periphery. In the present embodiment, type characters are provided for the letters of the alphabet and various numeral digits ranging from "0" to "9." The wheels 11 are rotatably mounted independently of each other on a stationary hollow bearing tube 12, and each has a gear 13 integral therewith. Gears 13 mesh with idlers 14 rotatably mounted independently of each other on a stationary shaft 15. The idlers are formed of electrical insulating material, such as nylon plastic.

The idler gears 14 mesh with large metal gears 16 carried by a hollow drive tube 17. Means are provided to normally frictionally maintain the drive tube 17 in driving relation with the various gears 16, while at the same time maintaining the tube out of electrical contact with such gears. As shown particularly in Fig. 2, each gear 16 is rotatably mounted on a flanged spool 18 of insulating plastic material. Each of the latter spools has an inwardly extending tongue 22 which fits in a longitudinally extending slot 117 in the drive tube. This entire assembly is located between retainer rings 19 and 23, suitably secured to the tube by lock screws 20 and 24, respectively. A compression spring 25 extending between the ring 19 and an adjacent one of the spools 18, yieldably presses the assembly toward the ring 23, thus forming a frictional drive connection between the drive tube and the various gears.

Describing now the means for driving the tube 17, and consequently the type wheels, the drive tube 17 is rotatably mounted at its opposite ends in bearings 26 and 27 carried by the frame 127 of the printer.

A gear 28 keyed to one end of the drive type 17, meshes with a compound gear 30 rotatably mounted on the aforementioned shaft 15. The large gear of the compound gear 30 meshes with a pinion 31 attached to the shaft 32 of a continuously driven motor (not shown).

Registration of the type wheels 13 is effected by arresting the various gears 16 at appropriate positions, depending on the particular data to be printed. For this purpose, a plurality of peripherally extending rows of solenoid operated stops 33 are carried by a semi-circular stop housing or casting 34 which is secured to the sides of the frame 127 by rods 35. The casting is electrically insulated from the rods 35 by sleeves 35*a* of insulating material.

The inner ends of the stops 33 in each peripheral row are spaced apart peripherally by amounts equal to the spacing between adjacent type characters 10 on the peripheries of the type wheels. The stops in any one row are adapted to be placed in the path of either of two metal stop lugs 36, each suitably attached to the side of the associated gear 16, whereby to arrest such gear.

The stop solenoids are in two different forms shown at 42 and 43 (Figs. 5 and 6, respectively). The solenoids 42 are located in each alternate peripheral row and the solenoids 43 are located in the intermediate rows so as to permit better nesting of the same in the casting 34 as will be seen in Fig. 4. It will also be noted that the solenoids 42 and their stops 33 are staggered peripherally relative to the solenoids 43 and their respective stops to enable such nesting. Thus every alternate stop 33 seen in Fig. 1 is associated with solenoids 42 and the remaining intermediate stops are associated with the solenoids 42.

Referring to Fig. 5, the solenoids 42, each comprises a cartridge 44 of non-magnetic material, such as brass, which encloses a stop inserting coil 45 and a stop withdrawing coil 46, the coils being separated by a suitable spacer 47. The two coils surround an armature pin 48 of ferrous material which is reduced at its forward end to form the aforementioned stop 33. Each cartridge is inserted within a hole formed in the casting 34 and is retained therein by a retainer plug 50 which is threadably

secured in the casting. The plug 50 is formed of a permanently magnetized material and is thereby effective to normally retain the armature 48 in its withdrawn position shown in Fig. 5 after being returned to such position. The plug has an axial opening 50*a* therein, through which circuit leads, i. e. 49, for the coils 45 and 46 extend.

The solenoids 43, each comprises a shell 51 which is threadably secured at 52 in the casting 34. Two coils 53 and 54, similar in construction and purpose to the coils 45 and 46, respectively, are enclosed in a cartridge 51*a* within the shell and surround an armature pin 55 which is also reduced at its forward end to form a stop 33. A plug 56 of permanently magnetized material is threaded into the outer end of the shell 51 to normally hold the armature pin 55 in withdrawn position.

Describing now the means for forming an imprint from the type wheels 11, a paper tape 57 is fed from a supply roll (not shown), upwardly over guide roll 157, between feed rolls 58 and 60, thence over a guide roll 61 and between a second pair of feed rolls 62 and 63. A printing ribbon 64 extends between the series of printing wheels 11 and the paper tape to transfer an imprint from aligned ones of the type characters onto the paper. Suitable means (not shown) are provided to intermittently rotate the roll 63 to advance the tape to present new blank spaces to the printing station.

A plurality of type hammers 65 are aligned with the different type wheels 11 and are all pivotally supported on a stationary cross rod 266 independently of each other. Springs, one of which is shown at 67, are tensioned between the hammers 65 and channel members 68, forming part of the machine frame, to normally retain the hammers in their position shown in Fig. 1.

Electrically operated means are provided for firing the different hammers 65. This means comprises, for each hammer, a solenoid 70 suitably attached to one of the several channel members 68. The armature 71 of each solenoid is coupled through a pin and slot connection 72 to a depending tail formed on the associated hammer.

The type wheels and hammers are closely spaced relative to each other and in order to accommodate the various solenoids 70, the latter are staggered angularly about the cross rod 266.

The section of the tape intermediate the feed rollers 58, 60 and 62, 63 is continually retained in a taut condition, and for this purpose a spring belt 73 is extended between pulleys 74 and 75 (Fig. 8) attached to the rollers 60 and 63, respectively. The pulley 75 is of somewhat smaller diameter than the pulley 74 so that the former, when intermittently driven in a clockwise direction tends to overdrive the paper.

Means are provided for viewing a printed line or portion of such line when the printing operation is interrupted and before the paper tape is line spaced from its printing station. For this purpose, a viewing prism 173 is provided, the latter extending across the series of type wheels and being carried by a bail 76 (see also Fig. 7) pivoted on the shaft 175 which supports the feed roller 63. The arms of bail 76 are provided with cam slots 76*a* which embrace the opposite ends of a cross rod 161 on which the guide roller 61 is rotatably mounted. The rod 161 is supported by the arms of a second bail 77 which is pivotally mounted on a cross rod 66. The latter rotatably supports the roller 60.

A spring 78 extending between a tail on the bail 76 and a suitable part (not shown) of the machine frame normally holds the bails in their relative positions shown in Fig. 1. However, when it is desired to view a line or portion of a line printed on the tape, the bail portion 79 of the bail 76 is pressed downwardly, lowering the prism 173 and advancing the roller 61 to locate the prism in viewing position as seen in Fig. 7 whereupon a printed line may be viewed by looking through the prism. In order to take up any slack in the tape due to displacement of the roller 61 in moving the parts to viewing position, an idler roller 164 is located adjacent the tape path. The roller is carried on an arm 165 and is urged against the tape by a spring 166.

Describing now the circuitry for controlling the printer, reference is had to Fig. 3. Data to be printed is obtained from a suitable data handling circuit which, for example, may comprise a memory unit generally indicated at 110 having a group of data output lines 111, one for each letter of the alphabet and for each numeral digit. The output from circuit 110 is in the form of pulses fed in timed succession along different ones of lines 111 depending on the context of the information.

The various lines 111 are connected in parallel to corresponding normally open contacts, i. e. 80, of a series of relays 81, 81*a*, 81*b*, etc. one for each denominational order of the printer. However, only the first three relays 81, 81*a*, 81*b* and the last relay 81*c* of a group are shown. Also, only the contacts, etc., for the digits "1," "2" and "3" and the letters "Y" and "Z" are shown. The mating contacts of the relays are connected in series with respective ones of the stop inserting solenoid coils 45, the latter being connected to a ground return line 82 to complete the solenoid energizing circuit.

The actuating coil 83 of each relay is controlled by a thyratron type tube, i. e. 84, such as the type commercially known as RCA #5823. The coil 83 is connected in the cathode circuit of the associated tube. The anode of the tube is connected to a B plus line 85 through a normally closed switch contact 86 located in the next succeeding relay, i. e. 81*a*. Firing potential for each tube is derived from a plus supply line 87, through a resistor 88, hammer controlled switch 90, line 91, and coupling condenser 92. Each switch 90 is controlled by the printing hammer 65 located in the preceding denominational order, i. e. associated with the preceding relay, so that whenever a relay is energized and its hammer accordingly operated in the manner to be described presently, the switch 90 associated therewith will be closed to fire the next succeeding tube, such as tube 84*a*, and thus cause energization of its relay, i. e. 81*a*. Thus, the various hammers will be operated in succession across the printer.

However, in order to secure sequential operation of the chain of relays, each tube ignitor must first be primed under control of a preceeding tube before it can be fired, the firing pulse itself being insufficient for this purpose. Therefore, a priming circuit is provided for each tube and comprises a voltage divider 93 connected between the cathode of the preceding tube and a B minus line 94. A line 95 is connected between the ignitor and a tap on the voltage divider. The values of the different parts of the divider 93 and the potential applied to line 94 is such that when any tube becomes conducting the rise in potential supplied by the voltage divider network 93 to the ignitor of the succeeding tube will be sufficient to prime this tube for the reception of the firing pulse.

As each relay is energized, the normally closed contacts 86 thereof will be opened to break the anode circuit of the preceding tube so as to deenergize such preceding relay.

Describing now the circuit means for controlling firing of each printer hammer 65, it will be seen in Fig. 3 that each printing hammer solenoid 70 is connected in series with a switch formed by one of the associated stop lugs 36 and a projected one of the stops 33. Each solenoid 70 is electrically connected on one side to the plus line 87 and on the other side to an associated brush 97 (see also Fig. 1) carried on a bar 297 mounted on a stationary channel member 197 connected to the frame of the machine. The various brushes 97 are electrically insulated from each other and each is held in wiping engagement with a respective one of the gears 16. When a lug 36 engages a projected stop 33, a circuit is completed through

these elements to the casting 34 which is suitably connected through a lead 331 to ground. Thus, when a stop lug 36 arrests against a projected one of the stops 33, the associated hammer actuating solenoid 70 is energized to fire its hammer 65 to imprint the paper against an aligned type character on the now arrested type wheel. As each hammer fires, it permits the associated contacts 90 to close, transferring control to the next succeeding relay. At the same time a second set of contacts 99 associated with contacts 90, will be closed, completing a circuit from the supply line 85, line 100, and through the various withdrawing coils 46 or 54 (Figs. 5 and 6, respectively) of the different solenoids in the same peripheral row, to the ground line 82, thus, causing any previously projected stop 33 to be withdrawn. When a stop 33 is withdrawn, the associated gear train, including gear 16, will again rotate to turn the associated type wheel until again arrested by any associated projected stop.

Figs. 9, 10 and 11 illustrate a modified form of the invention which in some instances may result in a faster operation than the apparatus shown in Figs. 1 to 8. In this case, elements similar to those shown in the preferred embodiment will be similarly numbered. Here the printer construction is similar to the above described construction except that a layer 101 of insulating material is suitably bonded to the interior surface of the casting 34, the layer having openings therein through which the various stops 33 protrude. A plurality of strips 102 of thin flexible metal, one for each peripheral row of stops 33, is suitably bonded to the insulating layer 101, each strip being electrically insulated from the other. Each strip 102 is connected through a resistor 103 and coupling condenser 104 to the ignitor of the associated tube 84, the latter being primed in the same manner as described hereinbefore. Each stop 33, being slideably mounted in the casting 34, is electrically connected therewith. It will be recalled that the casting is electrically insulated as by sleeves 35*a* (Fig. 1) from the frame of the machine and it is connected, in this case, to the plus supply line 87.

Each metal strip 102 has a series of openings 106 through which the stops 33 may project without contact therewith. However, a portion of the strip surrounding such opening is formed to present a flexible contact finger 105 with which the stop engages when the latter is inserted into the path of a stop lug, i. e. 36. Thus, a circuit is completed from the supply line 87 to the ignitor of the tube in the next succeeding denominational order to fire such tube.

As each stop solenoid is energized to insert its stop 33 in the path of the associated stop lug 36, control will be transferred to the next succeeding relay notwithstanding the fact that appreciable time might elapse before the associated gear 16 is arrested. Accordingly, the switches 90 and their circuit connections are omitted and the switches 99 are retained to energize the stop withdrawing solenoids in any row soon after a hammer in that row is fired.

Fig. 12 illustrates a modification of part of the control circuit shown in Fig. 3 in order to permit a predetermined type wheel, such as the leftmost one of the gang of wheels 11, to print the first digit or letter following a line space operation of the paper tape.

For this purpose, a star cam 163 is suitably attached to the paper feed roll 63 and cooperates with a normally closed set of contacts 107 inserted in the B plus supply line 85 ahead of the various relay contacts 86. Normally, when the paper tape is at rest, the contacts 107 are closed to supply a positive potential to all contacts 86.

However, during a line space operation occurring at the end of a line of print or before (in the event the roll 63 is advanced manually by rotating a suitable knob, not shown) the star cam 163 will cause contacts 107 to open, thus rendering the currently conducting tube nonconductive to drop its associated relay. Simultaneously,

a movable blade 108 is shifted by the star cam to close contacts 109 to connect a source of positive potential 115, through line 164 to the ignitor of tube 81. The potential thus applied is sufficient to directly fire the tubes in the absence of any priming potential. As the contacts 109 close, they are latched in such condition by a latch 165 pivoted at 166 and spring urged into latching relation with the movable blade 108. Thus, as the roller 63 reaches its next line space position, the star cam 163 allows the contacts 107 to reclose causing the tube 81 to conduct and relay 86 to energize. Tube 84 will at this time be primed in the manner above described. The next pulse applied through any of the digit lines 111 will be effective to project a corresponding stop 33 in the first order and, as a lug 36 on the associated gear 16 strikes such stop, a circuit is completed through the first order hammer operating solenoid 70 to cause the respective hammer lever 65 to print the corresponding digit or letter. The switches 90 and 99 associated with such first order hammer now closed to fire the next tube in the succession and to withdraw the projected stop 33 in the first order. Also, as the first order hammer lever 65 fires, a link 167, connected between such hammer lever and the latch, by a pin and slot connection 168, releases the latch.

Although we have described our invention in detail in its preferred and modified forms and have therefore utilized certain specific terms and languages herein, it is to be understood that the present disclosure is illustrative rather than restrictive and that changes and modifications may be made without departing from the spirit or scope of the claims appended hereto. For example, information in the form of pulses may be obtained from punched tape, punched cards, magnetic tape, etc., as is well known in the art, and applied to the various data lines. Also, although the printer disclosed herein is capable of printing both alphabetic letters and numerals, the latter can obviously be revised to print numerical digits only, or alphabetical letters only, or any other suitable information symbols.

Having thus described the invention, what we desire to secure by United States Letters Patent is:

1. In a high speed printing apparatus, the combination comprising a type wheel having a plurality of type characters thereon, a type hammer operable to cause an imprint from said wheel, yieldable means for rotating said type wheel, said means including a yieldably driven element; a stop member carried by said driven element, means for arresting said stop member in any of a plurality of different positions of said driven element whereby to arrest said type wheel in position to present any of said type characters in printing position, an electromagnetic device for operating said hammer, normally open circuit connections for said electromagnetic device, and means including said stop member responsive to arresting thereof by said arresting means for closing said circuit connections.

2. The combination according to claim 1 comprising an electromagnetic device for rendering said arresting means ineffective, normally open circuit connections for said last mentioned device, and means including said hammer responsive to operation thereof by said first mentioned electromagnetic device for closing said last mentioned circuit connections.

3. In a high speed printing apparatus, the combination comprising a type wheel having a plurality of type characters thereon, means for obtaining a printing impression from said type wheel, yieldable means for rotating said type wheel, said means including a yieldably driven element; a stop member carried by said driven element, a plurality of stop elements spaced along the path of movement of said stop member and selectively projectable into said path whereby to arrest said member in any of different positions to present any of said type characters in printing position, an electrically operable device for

operating said hammer, normally open circuit connections for said electrically operable device, and means comprising said stop member and any projected one of said stop elements for completing said circuit connections.

4. In a high speed printing apparatus, the combination comprising a plurality of type wheels arranged in side by side relation, said type wheels each having a plurality of type characters therearound, type hammers operable to cause imprints from respective ones of said wheels, means including yieldably driven elements for rotating respective ones of said type wheels; means for arresting a first one of said driven elements in any of a plurality of different positions whereby to arrest its respective type wheel to present one of said type characters thereon in printing position, a device rendered effective by said first means upon arresting said last mentioned driven element for operating a first respective type hammer, a second arresting means for arresting a second one of said driven elements in any of a plurality of different positions whereby to arrest its respective type wheel to present one of said type characters thereon in printing position, and means controlled by said first hammer upon operation thereof for causing said second arresting means to arrest said second driven element.

5. In a high speed printing apparatus, the combination comprising a plurality of type wheels arranged in side by side relation, said type wheels each having a plurality of type characters therearound, individual means for obtaining printing impressions from respective ones of said type wheels, means including yieldably driven elements for rotating respective ones of said type wheels; individual means for arresting respective ones of said driven elements in any of a plurality of positions whereby to arrest the respective type wheels to present different ones of said type characters in printing position, a device rendered effective by said arresting means upon arresting one of said driven elements for causing operation of its said respective printing impression means, and means controlled by said last mentioned printing impression means upon operation thereof for causing another of said arresting means to arrest another of said driven elements.

6. In a high speed printing apparatus, the combination comprising a plurality of type wheels arranged in side by side relation, said type wheels having a plurality of type characters therearound, type hammers operable to cause an imprint from respective ones of said type wheels, means including yieldably driven elements for rotating respective ones of said type wheels; electrically operated stop elements associated with each of said driven elements for arresting said driven elements in any of a plurality of different positions, circuit connections for controlling said stop elements, a switching mechanism for switching said circuit connections from the stop elements associated with one of said driven elements to the stop elements associated with another of said driven elements, means responsive to arresting of one of said driven elements by its respective stop element for operating its respective type hammer, and means controlled by said hammer upon operation thereof for causing operation of said switching means.

7. In a high speed printing apparatus, the combination comprising a type wheel having a plurality of type characters therearound, a type hammer operable to cause an imprint from said wheel, drive means for said wheel including a rotatably driven element having means thereon forming an abutment, and means for yieldably rotating said element; a plurality of stops spaced along the path of movement of said abutment and selectively movable into said path whereby to arrest said element in different positions, a device rendered effective by one of said stops upon arresting said drive element for operating said type hammer, an electrically operated device for withdrawing said last mentioned stop from the path of said abutment, normally open circuit connections for said electrically operable device, and means controlled by said type hammer upon operation thereof for closing said circuit connections.

8. In a high speed printing apparatus, the combination comprising a plurality of type wheels arranged in side by side relation, said type wheels having a plurality of type characters therearound, type hammers operable to cause an imprint from respective ones of said type wheels, means including yieldably driven elements for rotating respective ones of said type wheels; said elements having abutments thereon, a plurality of stops spaced along the path of movement of each of said abutments, each stop being movable into said path whereby to arrest its respective type wheel in any one of a plurality of printing positions, electrically operated devices for moving selected ones of said stop members into said paths, circuit connections for said electrically operated devices, a switching mechanism for switching said circuit connections from the electrically operated devices associated with one of said driven elements to the electrically operated devices associated with another of said driven elements, means responsive to arresting of one of said driven elements by its respective stop of operating its respective type hammer, and means controlled by said hammer upon operation thereof for operating said switching means and for withdrawing any of said stops from the paths of their associated abutment.

9. In a high speed printing apparatus, the combination comprising a type wheel having a plurality of type characters thereon, means for obtaining a printing impression from said type wheel, means for rotating said type wheel, a stop member carried by said rotating means, a plurality of stop elements spaced along the path of movement of said stop member and each selectively projectable into said path whereby to arrest said type wheel in any of different positions to present any of said type characters in printing position, a device responsive to engagement of said stop member with a projected one of any of said stop elements for causing operation of said printing impression means, and means responsive to operation of said printing impression means for withdrawing said projecting stop element from the path of said stop member.

10. In a high speed printing apparatus, the combination comprising a type wheel having a plurality of type characters thereon, a type hammer operable to cause an imprint from said wheel, yieldable means for rotating said type wheel, said means including a stop member, a plurality of stop elements spaced along the path of movement of said stop member and each selectively projectable into said path whereby to arrest said member in any of different positions to present any of said type characters in printing position, a device responsive to engagement of said stop member with a projected one of said stop elements for operating said type hammer, and means controlled by said type hammer upon operation thereof for retracting said projected stop element.

References Cited in the file of this patent

UNITED STATES PATENTS

1,675,969	Bull	July 3, 1928
1,909,550	Pierce	May 16, 1933
2,157,035	Torkelson	May 2, 1939
2,566,944	Last	Sept. 4, 1951
2,627,807	Buhler	Feb. 10, 1953
2,720,832	Luning	Oct. 18, 1955
2,742,855	Hofgaard	Apr. 24, 1956