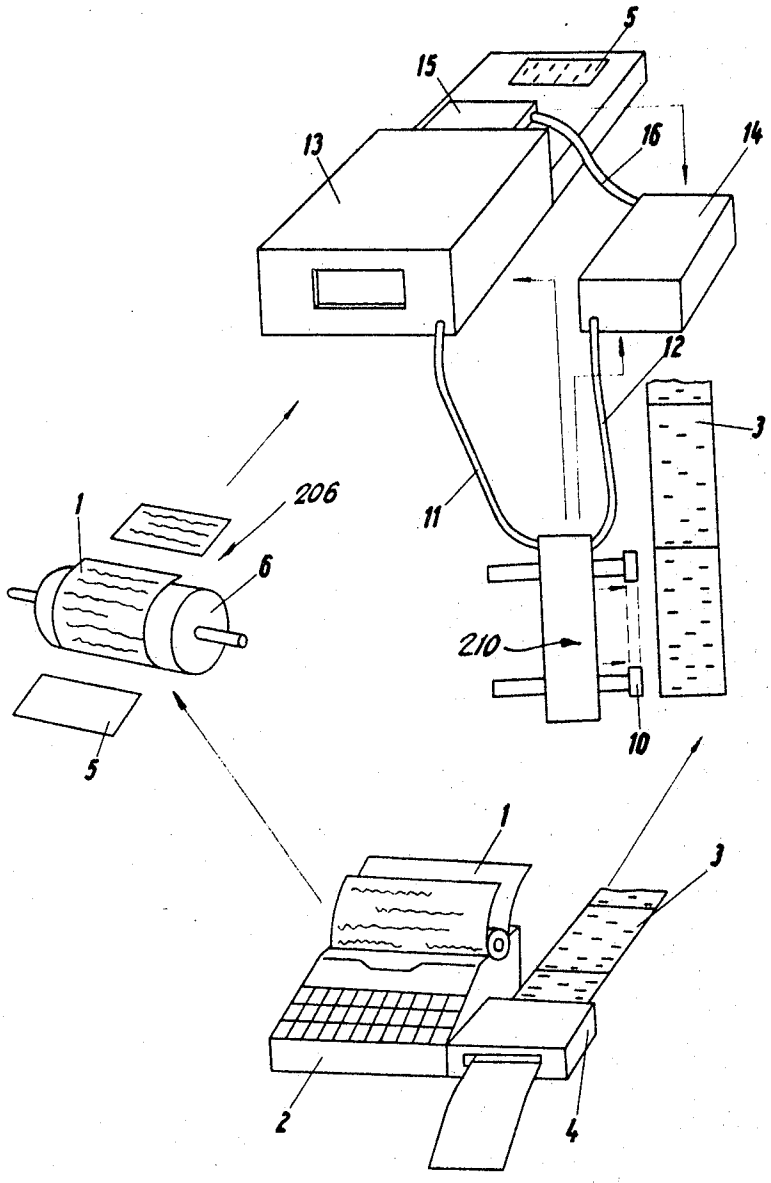
Sept. 23, 1969 G. RITZERFELD 3,468,245

APPARATUS FOR PRINTING AND RECORDING ON CARDS

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Fig. 1



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Sept. 23, 1969 G. RITZERFELD 3,468,245

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Fig. 2

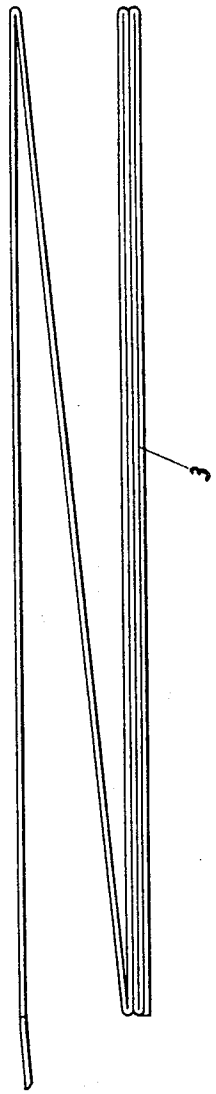
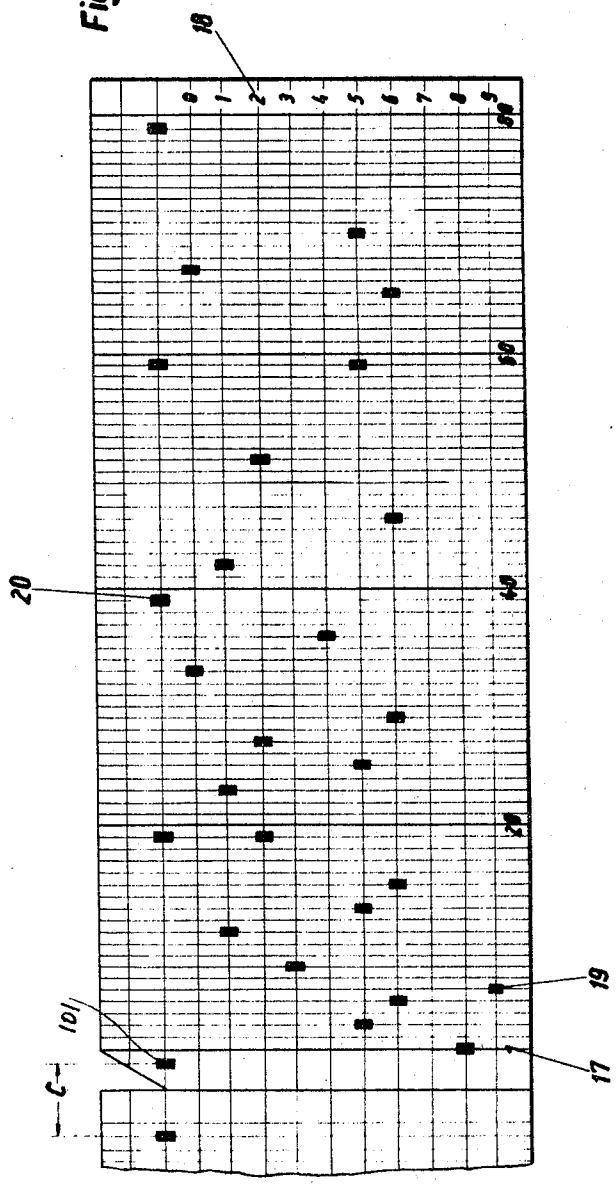


Fig. 2a



Inventor:

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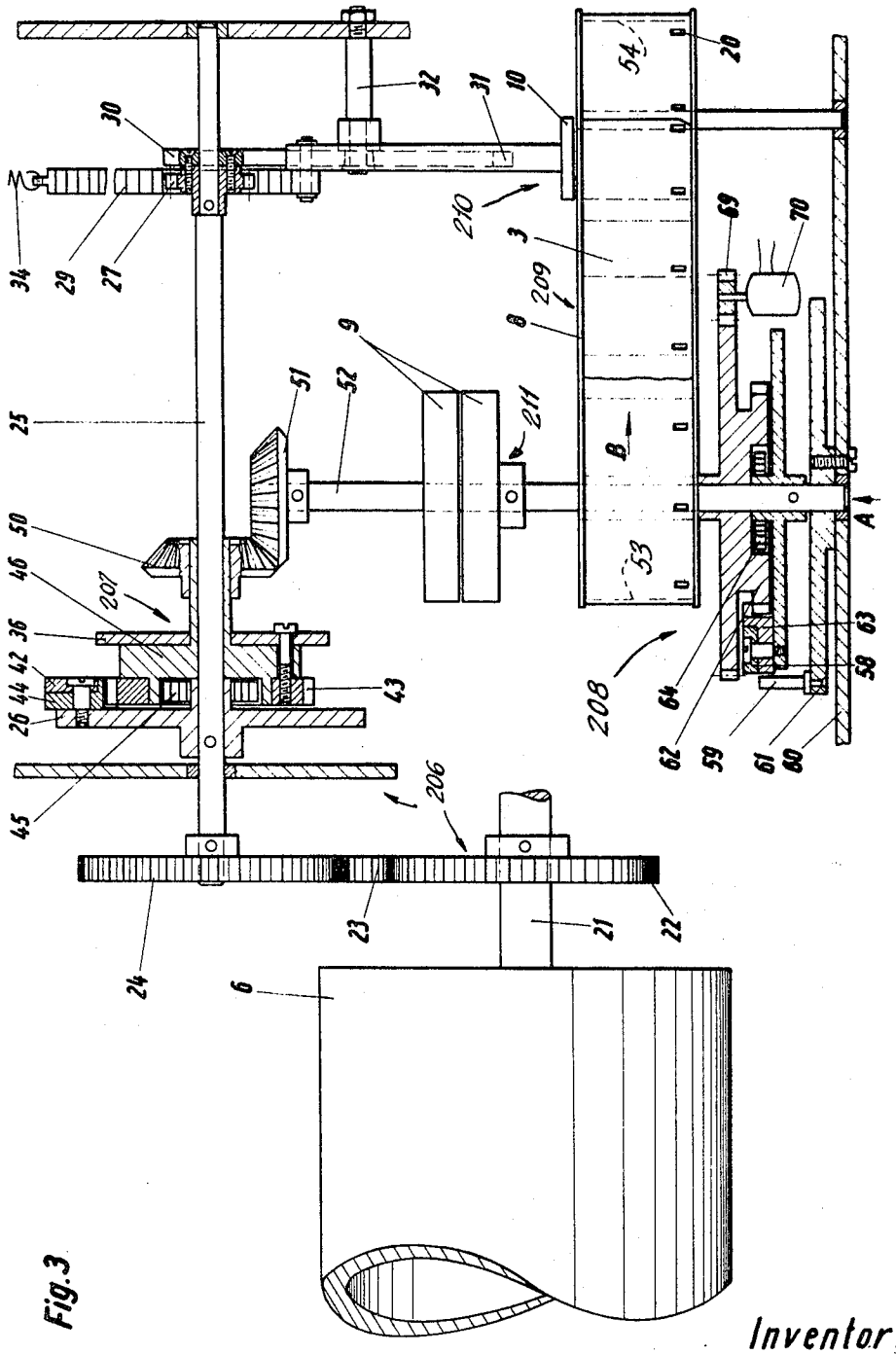


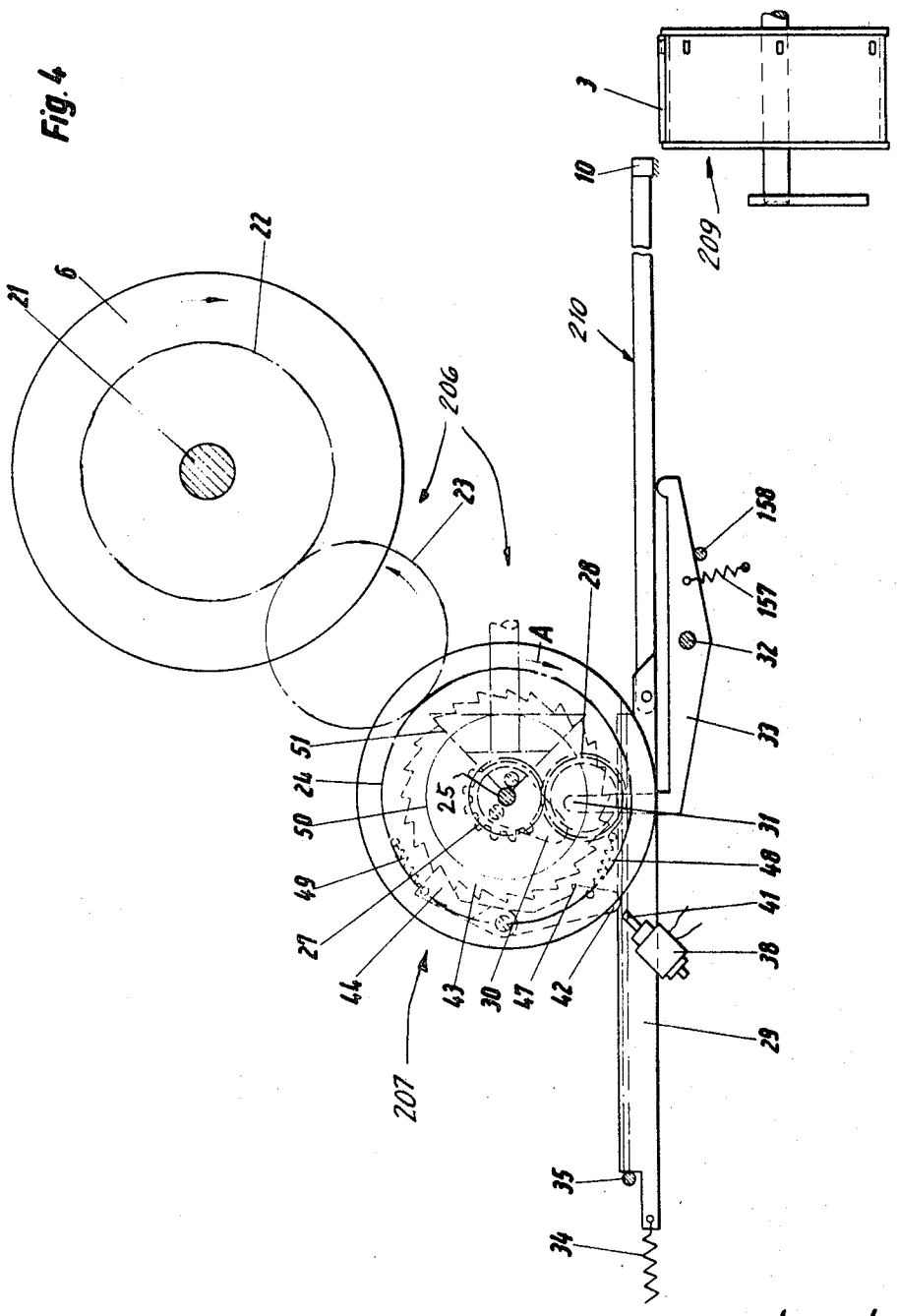
Fig. 3

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APPARATUS FOR PRINTING AND RECORDING ON CARDS

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Fig. 4

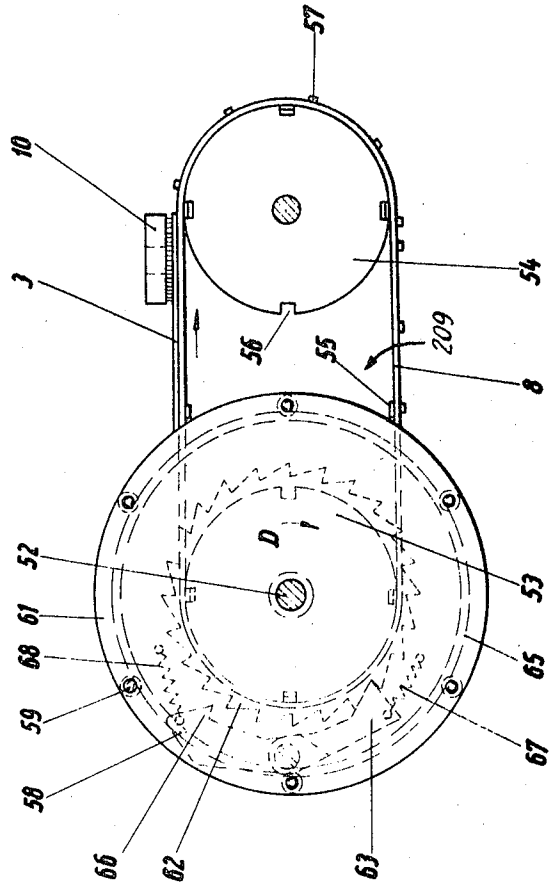


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Fig.5



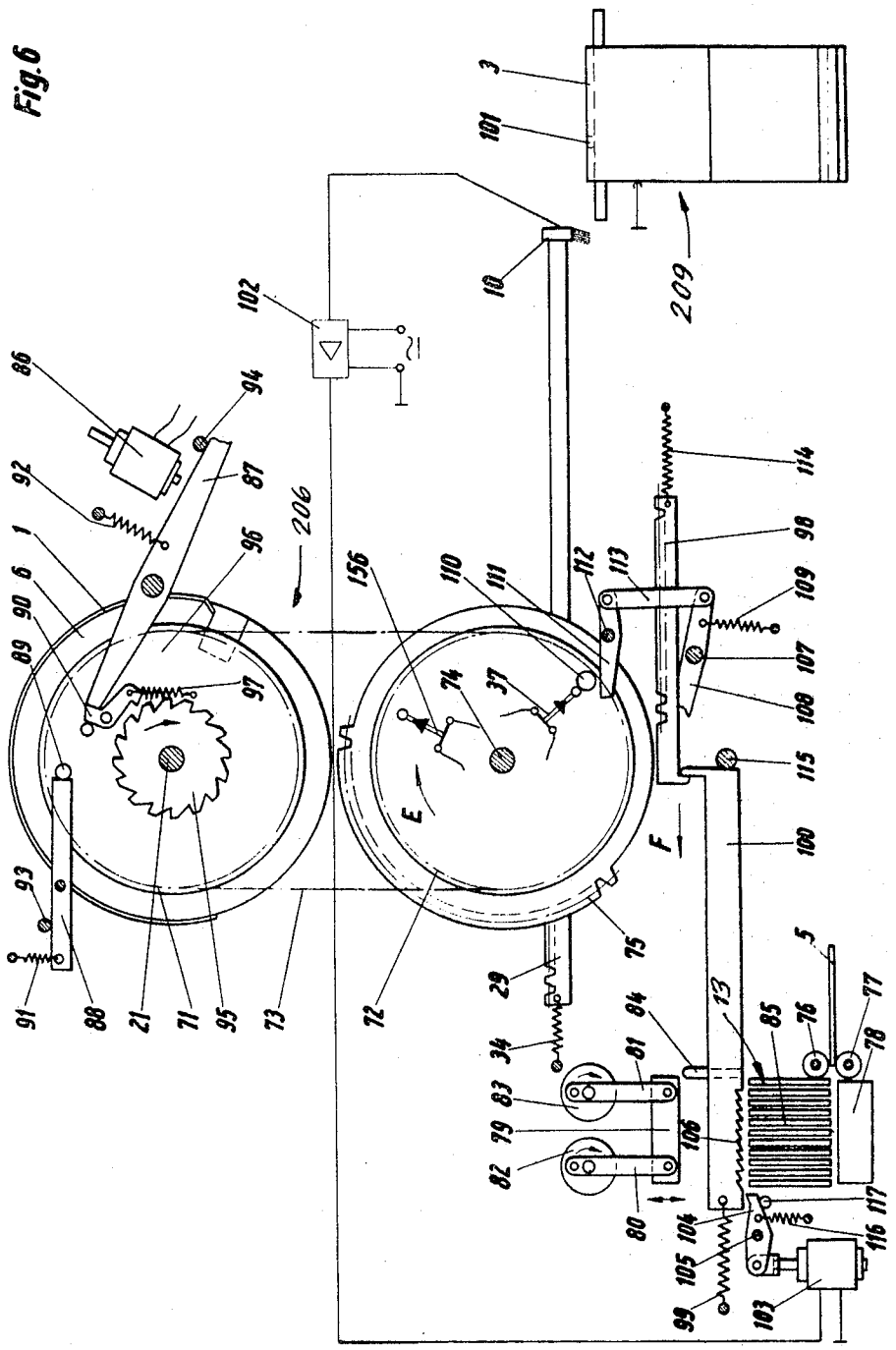
Inventor :

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APPARATUS FOR PRINTING AND RECORDING ON CARDS

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Fig.6



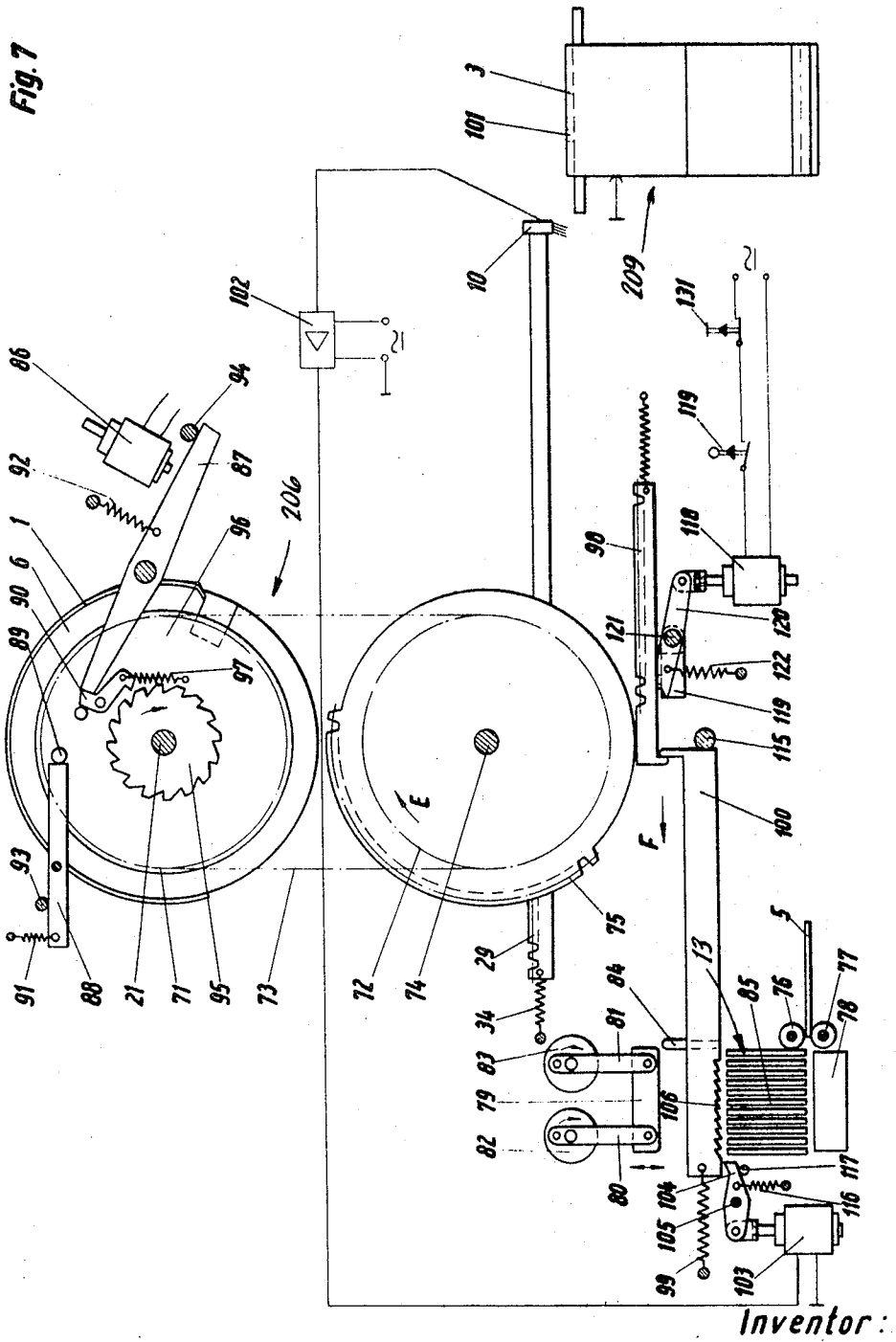
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Fig. 7



Inventor:

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Fig. 9

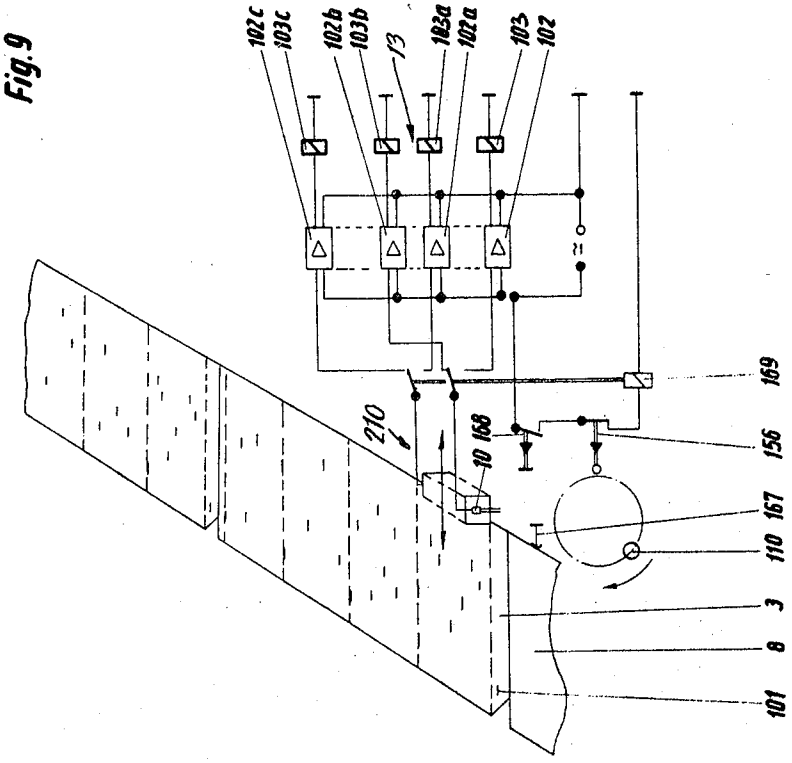
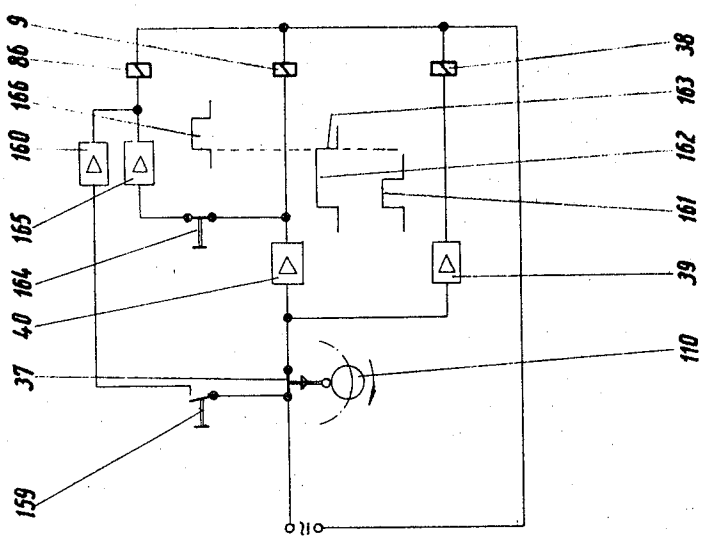


Fig. 8

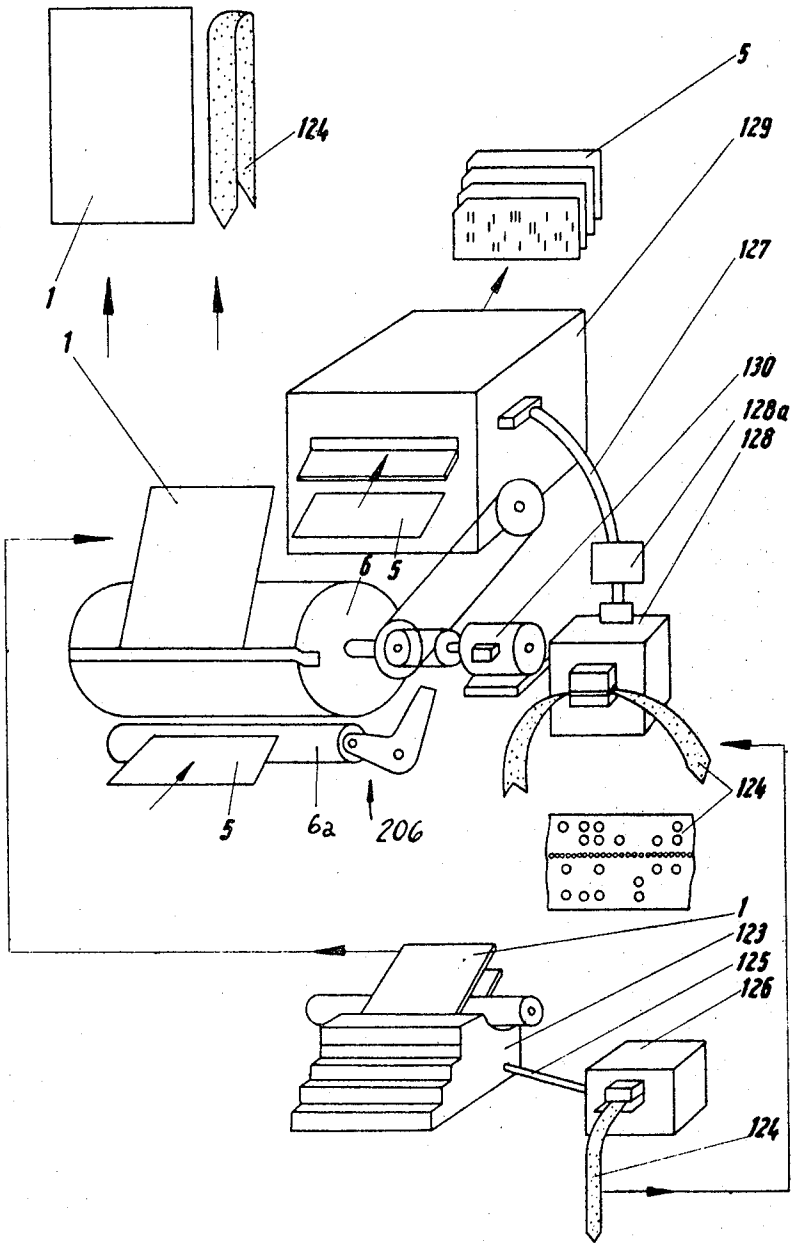


Inventor:

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Fig. 10

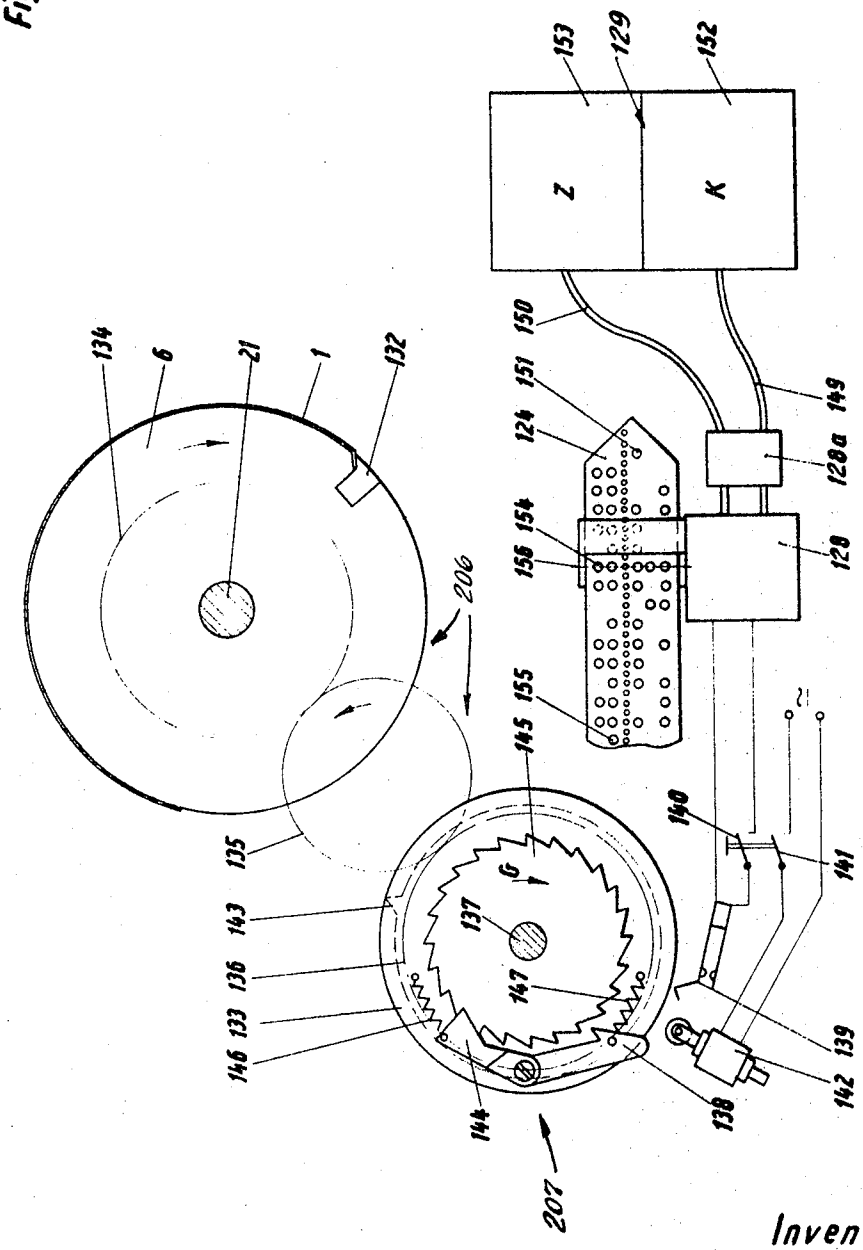


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APPARATUS FOR PRINTING AND RECORDING ON CARDS

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Fig. 11

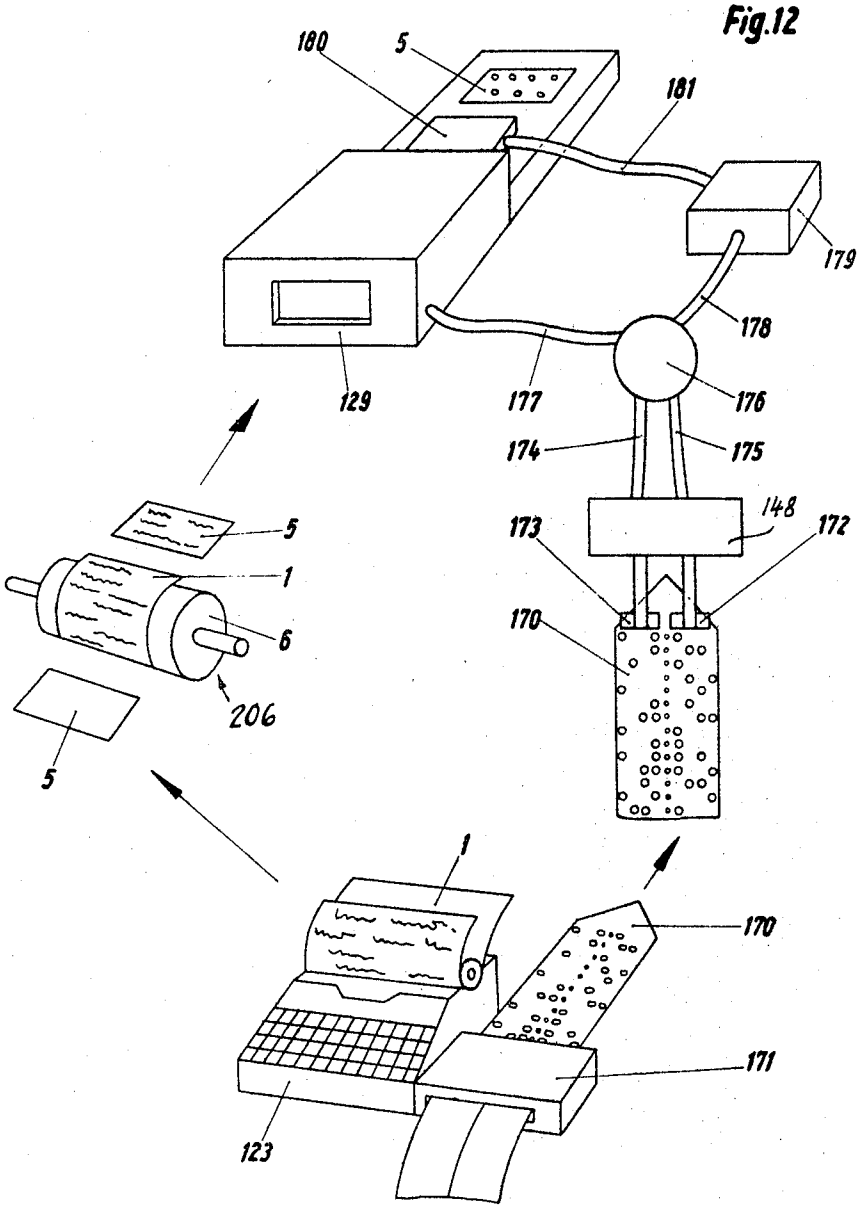


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Fig.12

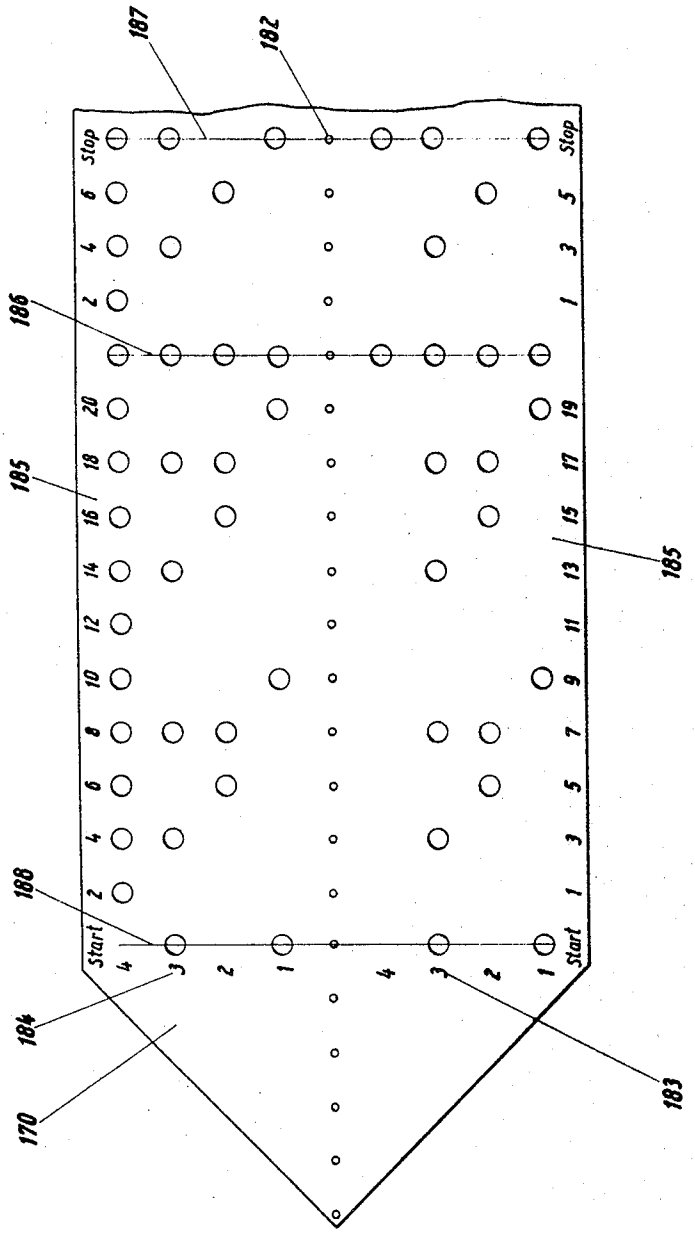


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Fig.13

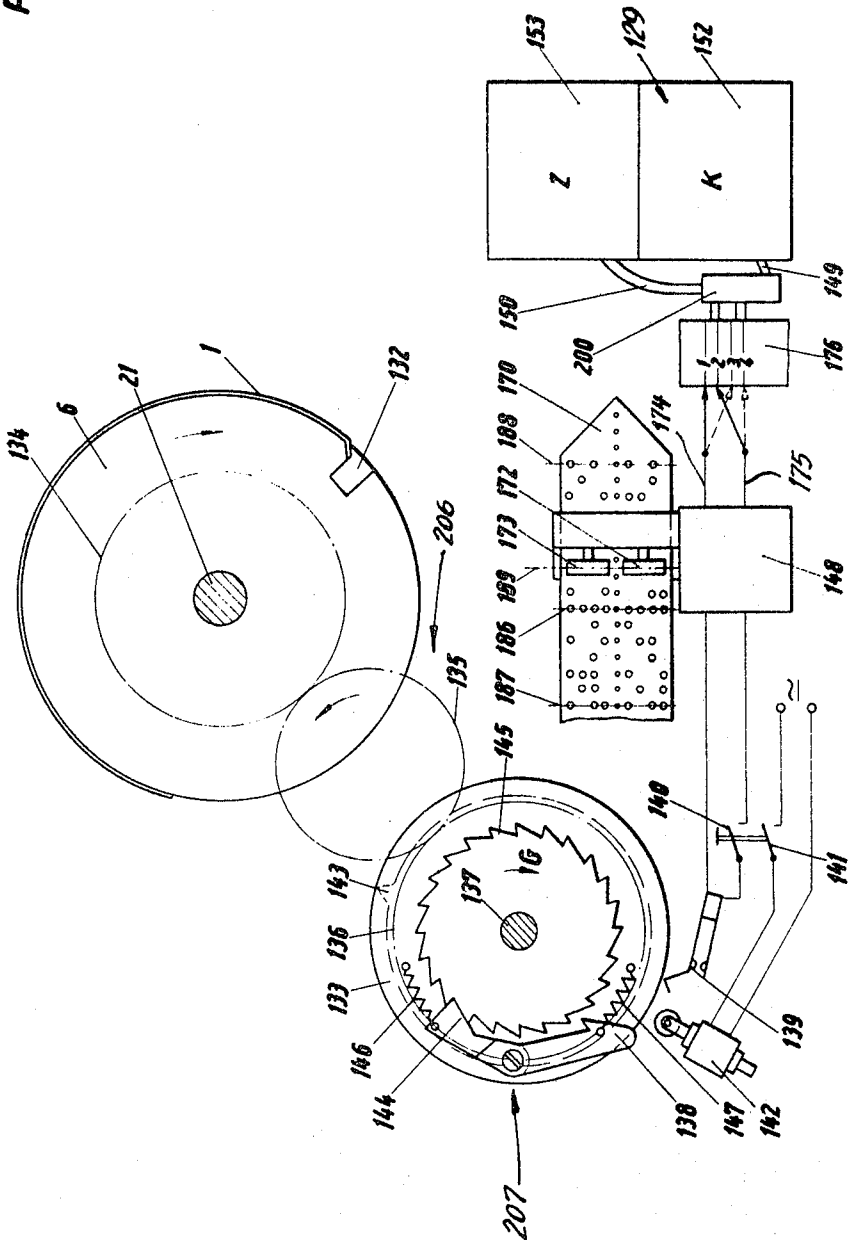


Inventor:

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Fig. 14

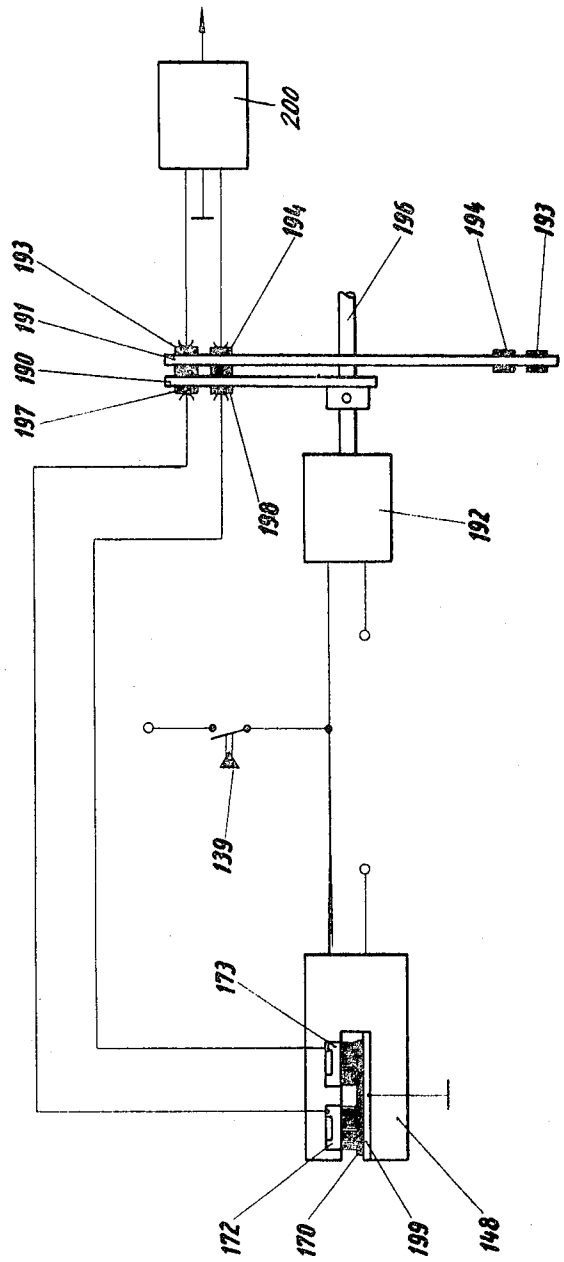


Inventor:

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Fig. 15



Inventor:

United States Patent Office 3,468,245 Patented Sept. 23, 1969

3,468,245

APPARATUS FOR PRINTING AND RECORDING ON CARDS

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Filed Apr. 24, 1967, Ser. No. 633,041
Claims priority, application Germany, Apr. 29, 1966, R 43,162; July 22, 1966, R 43,751
Int. Cl. B41l 47/46; B41j 11/00
U.S. Cl. 101—91 25 Claims

ABSTRACT OF THE DISCLOSURE

The transporting means of a record carrier having sections corresponding to text sections of a printing master, shift the record carrier to the next section whenever a printing machine is set to print different text sections of the printing master on successively supplied cards which are then punched under the control of a read-out device reading out the record carrier.

Cross-references to related applications

My copending applications Ser. Nos. 583,506, 584,048, and 621,723 disclose arrangements related to the present invention.

Summary of the invention

It is one object of the invention to provide an improved apparatus for automatically printing and recording the same information on each card on a series of cards representing different information.

Another object of the invention is to control the transport of a record carrier providing the information recorded on the card, in synchronism with the setting of the printing machine to print different text sections on successive cards.

With these objects in view, the present invention relates to an apparatus for printing and recording on a series of successive cards each of which represents different information in the form of recordings and legible imprints representing the same subject matter.

In accordance with one embodiment of the invention, a printing machine includes printing means, for example a duplicating drum and a counterpressure roller, a printing master having a series of text sections, and control means, preferably including cam means, controlling the printing means, for example a counterpressure roller, to successively print different text sections of the printing master on cards successively supplied to the printing means.

The read-out device includes transporting means for transporting an elongated record carrier composed of a series of consecutive sections having recordings respectively representing the same information as said text sections.

Means connect the control means with the transporting means so that the transporting means transport a section of the record carrier to the read-out device when the control means control the printing means to print the correlated text section of the master on a card. A recording device receives imprinted cards from the printing machine and is controlled by the read-out device to record on each card the information imprinted thereon by the printing means.

In one embodiment of the invention, the record carrier consists of a series of standard punch cards connected by accordion pleats. In another embodiment of the invention, the record carrier is a perforated tape. In a third embodiment of the invention, the record carrier is a perforated tape, divided into two longitudinal halves so

that each section representing a text section of the master, consists of two adjacent half sections each of which has perforations arranged in longitudinal and transverse lines in accordance with a code. The two longitudinal halves of the record carrier of this embodiment are read out by a pair of readout means. This arrangement pemits the use of a record carrier tape which is half as long as a standard tape representing the same information.

In the preferred embodiment of the invention the printing machine has a printing drum supporting the master, a counterpressure roller, a cam rotating in synchronism with the printing drum and operating the counterpressure roller to move to a printing position for printing a text section. The control means automatically turn the cam an angular distance corresponding to the spacing between two successive text sections of the master after each revolution of the printing drum so that successive text sections are printed on successive cards. A transmission connects the cam with the transporting means of the read-out device so that the record carrier is shifted to the next sections representing another text section of the master, when the cam is shifted to cause printing of the respective other text section.

Preferably, a spring loaded stepping device is provided for angularly shifting the cam, and the stepping device is operated by an electromagnet.

The transporting means for the record carrier have preferably sprocket rollers engaging transporting holes in the record carrier and being connected by an electromagnetic coupling to the rotary control means of the printing machine so that the transport of the record carrier takes place when the coupling is engaged due to the closing of a switch by a rotating member of the control means.

In the embodiment of the invention in which the record carrier consists of a series of connected cards which can be folded when not in use, the transport holes of the leading and trailing ends of two connected cards are spaced a different distance than the other transport holes. In accordance with the invention, the control means are automatically shifted by spring loaded stepping device in this region so that successive cards are properly read out.

The record carrier is provided with control perforations which are read out and control the starting and stopping of the transporting means for the record carrier.

If the master has a head section in addition to a plurality of text sections, and the counterpressure roller is operated by a head section cam in the usual manner to print a head section on each card in addition to a varying text section, the first section of the record carrier has recordings representing the information of the head section, and the following sections of the record carrier have varying information representing the different text sections. The recording device is provided with first storage means for storing the information concerning the head section read out from the first section of the record carrier so that, e.g., a punching device punches every card with this information. Another storage device temporarily stores the information concerning the text sections read out from other sections of the record carrier, and this information is cleared when the read-out device reads out a control recording following each section of the record carrier.

In the preferred embodiment of the invention, the recordings are punched into the record carrier and read out by brushes. The recording device is also a punching device so that the cards are with the same information which is also imprinted thereon.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together

with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing.

Brief description of the drawing

FIG. 1 is a schematic perspective view illustrating a first arrangement according to the invention employing a record carrier consisting of foldable cards;

FIGS. 2 and 2*a* are respectively a side view and a plan view of a folded record carrier;

FIG. 3 is a fragmentary plan view, partially in section, illustrating the means by which a printing drum is connected with a transporting means of a read-out device;

FIG. 4 is a fragmentary side elevation illustrating parts of the apparatus shown in FIG. 3;

FIG. 5 is a fragmentary side elevation taken in the direction A in FIG. 3;

FIG. 6 is a fragmentary schematic side elevation illustrating the means for synchronizing the operation of the recording device with the rotation of the printing drum;

FIG. 7 is a side elevation corresponding to FIG. 6 but illustrating a modification;

FIG. 8 is a circuit diagram illustrating the circuit of the apparatus shown in FIGS. 3 to 5;

FIG. 9 is a partially a perspective view, and partially a circuit diagram illustrating a circuit of a read-out device;

FIG. 10 is a schematic perspective view illustrating a modified arrangement in which a record carrier tape is used;

FIG. 11 is a fragmentary schematic side view illustrating details of the embodiment of FIG. 10, parts being omitted for the sake of clarity and simplicity;

FIG. 12 is a schematic perspective view illustrating a third arrangement in which a record carrier with perforations arranged in two longitudinal halves is used;

FIG. 13 is a plan view illustrating a portion of the record corner tape used in the embodiment of FIG. 12;

FIG. 14 is a fragmentary schematic side elevation, illustrating details of the embodiment of FIG. 12, parts being omitted for the sake of simplicity and clarity; and

FIG. 15 is partly a schematic view, and partly a circuit diagram illustrating the circuit of the emebodiment of FIGS. 12 to 14.

Description of the preferred embodiments

FIG. 1 schematically illustrates an arrangement of the invention in which a printing master or printing form **1** is made on a typewriter **2** which controls punching mechanism **4** by which the information is recorded in the form of punched holes on a record carrier blank **3**. Instead of punching mechanism **4**, another recording apparatus producing recordings which can be optically or magnetically read out may be used.

The finished master is attached to the duplicating drum **6** so that the information is printed on copy sheets **5**. Printing drum **6** is part of a known selective duplicating machine **206** permitting the printing of selected text sections or lines of master **1** on successive copy sheets **5**. Printing drum **6** is operatively connected with transporting means by which the record carrier **3** is transported, for example with a transporting band **8** which will be described with reference to FIGS. 3 and 5. In accordance with the invention, record carrier **3** is read out by sensing brushes **10** during a revolution of printing drum **6**, or phase shifted one or several operations to the respective revolution of printing drum **6**. The information read out by brushes **10** from record carrier **3** is supplied to the punching device **13** and to a device **14** through cables **11** and **12** containing electric wires. Punching device **13** punches the information on a the already imprinted copy sheet **5**, which preferably is a punch card. The punched copy sheet or card is supplied to sensing means **15** which reads out the punched information and supplies the same to the checking device **14** where the information is compared with the information supplied through cable **12**, and when the information punched on card **5** is not identical with the information contained in the corresponding section of the record carrier **3**, the machine is automatically stopped.

Record carrier **3** is shown in FIG. 2 and FIG. 2*a* to consist of a plurality of interconnected cards of standard size as conventionally used in data processing machines. Due to the accordion pleats between the cards, a stack is formed of the several interconnected cards forming the record carrier **3**. The transverse lines **17** may be arranged in groups of **20** lines, each group being respectively associated with the head section, first line or text section, second line or text section etc. of the master. The longitudinal lines **18** represent digital values. Transporting holes **20** are provided for transporting the record carrier in longitudinal direction, and information representing holes **19** are punched by the punching device **4** into record carrier **3**.

As shown in FIGS. 3, 4, 6 and 7, the printing drum **6** of duplicating machine **206** carries on the periphery thereof a master sheet **1** and is mounted for free rotation on shaft **21** to which a toothed coupling wheel **95** is fixed which cooperates with the coupling pawl **90** biased by spring **79** and being pivotally mounted on printing drum **6**. A start lever **87** is held by spring **92** against stop **94** in an initial position in which pawl **90** is held out of engagement with coupling wheel **95**. When the start magnet **86** is energized, start lever **87** releases coupling pawl **90** which couples printing drum **6** with coupling wheel **95** so that the same rotates one revolution until start lever **87** again releases pawl **90**. A lever **88** biased by spring **91** against a stop **93** cooperates with a stop **89** on the printing drum, preventing turning of the printing drum in counterclockwise direction in the initial position.

The printing drum cooperates with a counterpressure roller, not shown, in the usual manner.

As best seen in FIG. 3, shaft **21** is connected by gear train **22**, **23**, **24** with the shaft **25** which is mounted in walls of the machine and drives a stepping mechanism forming part of control means **207** which also include a cam **36**. Shaft **25** carries a fixed wheel **26** on which stepping pawl means **42**, **44** are pivotally mounted. Stepping pawl means **44**, **42** cooperate with a stepping wheel **43**. A spiral spring **45** is secured to the hub of wheel **46** and with a member **46** on which cam **36** is mounted by which the movement of a counterpressure roller, not shown, to and from a printing position is controlled so that a text section or line of the master is printed on the copy sheet or card.

Member **46** is secured by bolts to stepping wheel **43**, and also secured to a bevel gear **50** which meshes with a bevel gear **51** on a shaft **52** which is interrupted by electromagnetic coupling **9** which is part of operating means **211** by which transporting means **209** for record carrier **3** are actuated.

As shown in FIGS. 3 and 5, a toothed wheel **62** is mounted on shaft **52** and cooperates with arresting pawl means **66**, **63** mounted on a disk fixed to shaft **52** to form a second stepping mechanism **208**. A spiral spring **64** is provided which is secured to the disk and to arresting wheel **62** which has a gear portion meshing with a gear **69** driven by wind-up motor **70**. A flange fixed on a wall **60** has actuating pins **69** cooperating with arresting pawl means **63**, **66** which pawl **63** is biased by spring **67**, and pawl **58** biased by spring **68**.

A transporting band **8** forming an endless loop passes over transporting rollers **53**, **54** and has outer projections **57** engaging the transporting holes **20** of record carrier **3**. Transporting band **8** has inner projection engaging corresponding recesses **56** in transporting rollers **54**. Roller **53** is mounted on the hub of wheel member **62**, as shown in FIG. 3. Members **53**, **54**, **8**, **57** constitute transporting means **209** which are actuated by control means **207**.

A toothed segment **27** is secured to shaft **25** and cooperates with a gear **29** which meshes with a rack bar

29 carrying the read out brush means, 10, as best seen in FIGS. 3 and 4. A spring urges rack bar 29 to abut a stop 35 in an inoperative position of read out brush means 10. A cam 30 is fixed to gear segment 27 and cooperates with a cam follower 31 of a pivoted member 33 which is mounted on a pivot 32 and held by spring 157 against the stop 158. When cam 30 operates lever 33, brush means 10 is lifted above the level of record carrier 63.

As shown in FIG. 4., an electromagnet 38 has an armature 41 cooperating with stepping pawl 42, 44, when energized. As shown in FIG. 6, printing drum 6 is connected by chain drive including chain wheels 71, 72 and an endless chain 73 with a shaft 74 which carries a fixed gear segment 75 which rotates in synchronism with the printing drum 6.

The transporting rollers 76, 77 are provided for transporting a copy sheet or card 5 to the punches 85 of the punching device 13, see also FIG. 1. A pressure member 79 connected by links 80, 81 with eccentric drive wheels 82, 83 actuates coupling pins 84 in a member 100 to operate selected punches to punch a card or copy sheet 5 supplied by rollers 76, 77 to a gap between punches 85 and anvil 78. Member 100 is urged by spring 99 to the left as viewed in FIG. 7, and can be arrested by a pawl 104 turnable about a pin 105 and controlled by the armature of an electromagnet 103. A stop 117 defines the inoperative position of pawl 104. Member 100 is coupled with a rack bar 98 and pulled by spring 114 acting on the same against a stop 115. Rack bar 98 meshes with gear segment 59. A lever 108 is pivotable about a pin 107 and biased by spring 109 against rack bar 98, tending to snap over its free end. Level 108 is connected by link 113 to another lever 111 turnable about a pivot 112 and cooperating with a roller 110 on gear segment 75.

Referring now to the circuit diagram of FIG. 8, manually operated switches 159 and 164 are respectively connected with an amplifier 160 and a monostable flip-flop 165 which are connected with start magnet 86 by which the one revolution clutch 90, 95 is controlled. Switch 37, see also FIG. 6, is operated by roller 110 on gear segment 75 and is connected in series with a monostable flip-flop 40 and electromagnetic coupling 9. Another monostable flip-flop 39 is connected in series with electromagnet 38 which operates stepping pawl means 42, 44, as explained with reference to FIG. 4.

FIG. 9 illustrates the circuit of the read out brush means 10 of sensing means 210 including four parallel amplifiers 103, 103*a*, 103*b*, 103*c* respectively connected with electromagnets 102, 102*a*, 102*b*, 102*c* by which the arresting pawls 104 of the punching device are controlled. A relay 169 is connected in series with switch 156, see also FIG. 6 which is controlled by roller 110. A control switch 168 is connected in series with switch 156. The contacts of relay winding 169 are connected with the read out brush means 10.

During an operation, printing drum 6 is rotated by shaft 21 and one way clutch 95, 90 when the energized start magnet 86 causes release of coupling pawl 90 by start lever 87. Shaft 25 is driven over gears 22, 23, 24 in synchronism with the printing drum so that the pawl wheel 26 rotates. Gear segment 27 rotates with shaft 25 and meshes, after the printing operation has been completed, with gear 28 which drives rack bar 29 to move read out brush means 10 across record carrier 3 so that 20 brushes read out one group of 20 transverse lines of the record carrier shown in FIG. 2*a*. Shortly before gear segment 27 releases gear 28 and thereby rack bar 29, cam 30, which is fixed on gear segment 27, engages the follower 31 of lever 33 which raises brush means 10 to a position spaced from the record carrier. At this moment, gear segment 27 releases the gear 28 so that spring 34 is free to move rack bar 29 against stop 35 to the initial position, while lever 33 released by cam 30 abuts stop 158 under the action of spring 157.

Printing drum 6 turns toward the initial position shown in FIG. 6.

Impulses representing the information read out by brush means 10 are amplified by amplifiers 102*b*, 102*c* and control the magnets 103*b*, 103*c* since switch 156 is closed and the energized relay winding 169 holds its contacts in the position illustrated in FIG. 9. Magnets 103*b* and 103*c* control the punching device 13, as will be described in greater detail with reference to FIGS. 6 and 7.

In this manner, the information which was printed on the copy sheet or card by the master on printing drum 6, is also punched into card 5 in the punching device 78 to which the card is transported by transporting roller 76, 77.

If it is desired that during the next following revolution of printing drum 76, the next following line or text section of the master is printed, and the corresponding information punched into the card 5, it is necessary to displace the line cam 36, see FIG. 3 which controls the printing motion of the counterpressure roller, not shown, angularly in the direction A, see FIG. 4, so that the counterpressure roller is operated later than during the preceding operation, and assumes its printing position when the respective second line or text section of the master passes through the printing line.

In order to punch the same information into the imprinted card, it is necessary that record carrier 3 is shifted a corresponding step in a direction B indicated by an arrow in FIG. 3.

When the printing drum 6 arrives in the initial position, switch 37 is closed by actuating roller 110 which is secured to chain wheel 72 or to gear segment 75 which rotate in synchronism with printing drum 6 due to the chain 73. Since switch 73 is connected in series with electromagnet 38, the same is energized so that its armature 41 engages pawl 42 and presses the same into a notch of stepping wheel 43, while pawl 44 releases the stepping wheel so that the same is permitted to turn one step. Spiral spring 45 turns member 46 with line cam 36 in the direction of the arrow A until stepping wheel 43 is arrested by tooth 47 of pawl 42.

Referring now to FIG. 8, the machine operation was started by actuation of the manually operated switch 159 which causes energization of the start magnet 86. Actuating roller 110, turning with chain wheel 72, opens switch 37. When after one revolution of the printing drum 6, actuating roller 110 arrives in the initial position, switch 37 is closed, while the one revolution clutch 90, 95 stops the printing drum. Due to the closing of switch 37, the monostable flip-flops 39, 40 are energized, and magnet 38 is energized by a pulse 161 having a certain duration schematically indicated in FIG. 8. The magnetic clutch 9 is simultaneously energized by flip-flop 40 which produces a pulse 162 of a greater duration so that the transporting device 209 for the record carrier 3 is connected with the line cam 36. When transporting magnet 38 is again de-energized, the coupling of shaft 52 is maintained by magnetic clutch 9 for an additional time period so that a reliable shifting is assured. When the monostable flip-flop 40 disconnects the electromagnetic clutch 9, the pulse flank 163 energizes through holding contact 164 the monostable flip-flop 165 so that start magnet 86 is energized and automatically starts the next revolution of the printing drum. If the machine is to be stopped, switch 164 is opened so that start magnet 86 cannot be energized by monostable flip-flop 165, and the printing drum stops in the initial position.

When electromagnet 38 is de-energized after turning of line cam 36 through a step corresponding to another line of the master, pawl springs 48 and 49 pull pawls 42 and 44 to the initial position shown in FIG. 4 so that the line cam 36 is stopped in an angularly displaced position which causes the printing of the next following line of the master during the following revolution of the printing drum.

Assuming that the first line was printed and also punched on the card 5, and that the above-explained angular displacement of line cam 36 is carried out three times, bevel gears 50, 51 and the engaged magnetic coupling 9 move record carrier 3 a distance corresponding to three lines or text sections of the master by means of transporting rollers 53, 54, see FIG. 5.

Such a shifting of the line cam 36 and of record carrier 8 can be obtained by operation of switch 159.

FIG. 2*a* shows that the distance C between two consecutive transporting holes in two adjacent sections of the record carrier 3, is smaller than the standard distance of the transporting holes within a section which, as explained above, corresponds to the standard size punch card. Therefore, the shifting of the record carrier 3 by the transporting band 8 cannot be accomplished by the above-described steps, and a smaller step must be effected.

Assuming that electromagnetic coupling 9 is engaged, and that stepping magnet 38 is energized to effect a turning of line cam 36 for one step to effect the printing of the fourth line of the master sheet after the printing of the third aline of the master sheet, pawl 58 runs against a fixed pin 59 in stationary disk 61 and is pressed by the same into a notch of the arresting wheel 62, while pawl 63 releases arresting wheel 62. Spiral spring 64, see FIG. 3, turns arresting wheel 62, which is fixed to transporting roller 53, such an angular distance opposite to the direction D, see FIG. 5, until a tooth flank of arresting wheel 62 is engaged by pawl 66. When pawl 58 is turned beyond pin 59, springs 67 and 68 turn the pair of pawls 58 and 63 back to the position shown in FIG. 5. Pawl 58 releases arresting wheel 62, and spiral spring 64 turns arresting wheel 62 until the next following tooth abuts pawl 63 so that record carrier 3 has been moved by transporting roller 53 and transporting band 8 under the control of stepping mechanism 208 to a position in which the respective line thereof is located in the region of the read out brush 10.

Wind-up motor 70 can be energized by switch, not shown, to rotate arresting wheel 62 to its initial position tensioning spiral spring 64, and also spiral spring 65 through shaft 52, electromagnetic coupling 9 and gears 51, 52, while the machine is stopped.

Due to the uneven spacing of the transporting holes 20 of record carrier 3,, it is necessary that transporting band 8 and arresting wheel 61 are in a predetermined relative position when the machine is in the initial position, and this relative position is obtained by winding up spiral springs 45, 64 by motor 70. In the initial position of printing drum 6, record carrier 3 is placed on transporting band 8 in a position in which the first part of the record carrier 3, which carries the information of the head section of the master, is read out during the first revolution of printing drum 6.

Referring again to FIG. 6, as explained above, the gear segment 75 turns in synchronism with printing drum 6 in the direction of the arrow E. As explained with reference to FIG. 8, operation of switch 37 by roller 110 on chain wheel 72 and of manual switch 159 causes start of a revolution of the printing drum 6 by the energized start magnet 86. When during one revolution of printing drum 6, brush means 10 reaches record carrier 3, gear segment 75 engages rack bar 98 and moves the same in the direction of the arrow F. At the same time, a spring 99 urges the punch control member 100 to follow the movement of rack bar 98 and to move in synchronism with read out brush means 10 through the punching device 78.

When brush means 10 of sensing means 210 passes a punched hole in the record carrier, for example a hole 101, the circuit is closed, see FIG. 9, and a magnet 103 is energized over an amplifier 102. Magnet 103 operates pawl 104 which arrests punch control member 100 by engaging a notch 106 of the same. Due to the synchronization, the respective force transmitting pin 84 remains stopped above the punch 85 of the respective read out line until pressure plate 79 is operated by eccentric members 82, 83 to push down pin 84 so that the respective punch 85 punches a hole into the punch card or copy sheet 5.

Eccentric members 82 and 83 are connected by a suitable transmission with printing drum 6 and operate in synchronism with the same; however, the actuation of pressure plate 79 for punching information into card 5 may take place simultaneously, or one or two revolutions later, or at any desired moment.

Rack bar 98 is moved by gear segment 75 in the direction of the arrow F until arresting lever 108 engages the end of rack bar 98 and locks the same. Gear 75 turns further to the initial position while the punching position of pin 84 remains the same since control member 100 is not shifted. Only during the next following revolution of printing drum 6 and of gear segment 75, the punching device 13 is cleared since actuating roller 110 engages lever 111 so that the arresting lever 108 releases rack bar 98, permitting spring 114 to pull rack bar 98 and control member 100 opposite the direction of the arrow F until control member 100 abuts stop 115. Spring 116 of pawl 104 is designed and constructed so that it pulls pawl 104 against stop 117 only during the return movement of control member 100.

FIG. 7 illustrates an arrangement substantially corresponding to the arrangement of FIG. 6 but actuating roller 110 is omitted.

In the construction described with reference to FIG. 6, punching device 13 is cleared of the stored information by retraction of control member 100 during the next following revolution of printing drum 6. In the construction of FIG. 7, a magnet 118 is provided which is connected in series with switches 119 and 131 and is connected to an arresting lever 120 loaded by a spring 122 to turn about a pivot 121. When rack bar 98 has been moved by gear segment 75 so far in the direction of the arrow F that rack bar 98 releases the actuator of a switch 119, the same closes and energizes electromagnet 118 which turns arresting lever 120 to the position locking movement of rack bar 98 opposite to the direction of the arrow F.

When the punching device is to be cleared, switch 131 is opened so that electromagnet 118 is de-energized. FIG. 7 shows switch 119 twice, once schematically in the circuit of electromagnet 118, and once in the proper position to be operated by rack bar 98.

FIGS. 10 and 11 illustrate a modified arrangement in which the record carrier does not consist of folded cards, but is a perforated tape 124. A master 1 is written on a typewriter 123 which is electrically connected by cable 125 to a perforator 126 producing perforations in record carrier tape 124 representing the text type on typewriter 123 so that the head section of the text, and every line section of the same, corresponds to a section of the perforated tape 124, as schematically indicated in the left upper corner of FIG. 10. The master 1 is secured to the periphery of a printing drum 6 cooperating with a counterpressure roller 6*a* of a duplicating machine 206 in the usual manner to produce imprints of the head section, and of selected line sections on a card or copy sheet 5 under the control of a head cam and a line cam whose angular position in relation to the printing drum 9 can be changed, as explained with reference to FIGS. 3 and 4. The perforated tape 124 is read out by a read out device 128 and the information translated in the decoder or sensing means 128*a* and supplied through a cable 127 to a punching or recording device 129 which is operated in synchronism with printing drum 6 by motor 130 and a pulley and belt transmission. The imprinted card 5 is supplied to the punching device 129 and punched with the information derived from perforated tape 124 so that the same information, for example a certain line of the text appears in printed legible form and also in

the form of punched holes on the finished card 5. FIG. 11 illustrates details of the arrangement, certain parts which have already been described with reference to the first embodiment of the invention being omitted for the sake of clarity and simplicity. As shown in FIG. 11, the printing drum 6 is mounted on shaft 21 and connected with the same by one revolution coupling not shown in FIG. 11, but illustrated in detail in FIG. 6 and being actuated by start lever and start magnet. A gear 134 rotates with the printing drum and is connected by another gear 135 to a gear 136 corresponding to gear 24 in FIG. 3 and driving a wheel 133 of stepping mechanism 207 carrying pawl means 138, 144 cooperating with a ratchet wheel 145 and biased by springs 147 and 146. A spiral spring, not shown, and corresponding to spring 45 in FIG. 3, biases ratchet wheel 145 and a line cam 143 to turn in counterclockwise direction, while the drive from the printing drum takes place in the direction of the arrow G. An electromagnet 142 has an armature provided with a roller and being operable by closing of contacts 141 to actuate pawl means 138, 144 to permit one step of the ratchet wheel 145 and of line cam 143. A switch 139 is operated by the end of pawl 138 at the end of a revolution of the printing drum and is connected in series with a contact 140. Switch 139 controls the read-out device 128 which is connected by a decoder 128*a* and cables 149, 150, corresponding to cable 127 in FIG. 10, to the punching device 129 which includes a part 152 for repeatedly punching a constant head section, and a part 153 for punching different text sections on successive cards. The perforated tape is read out by the read-out device 128 and has a central line of transporting holes, and consecutive longitudinal sections in which punched holes represent the same information which is contained in lines or corresponding text sections of the master sheet 1.

At the beginning of an operation, a master 1 having a head section and a series of line sections is secured to printing drum 6 by holding means 132, and the record carrier tape which has the same information as the master sheet punched thereon is inserted into the read-out device. A start magnet, not shown, and corresponding to start magnet 86 shown in FIG. 6 and FIG. 8 is actuated, and contacts 140 and 141 are manually closed. Printing drum 6 performs one revolution and is then stopped by the one revolution clutch described with reference to FIG. 6. a text section of the master is printed on a card 5, see FIG. 10, since the counterpressure roller 6*a* is operated by line cam 143. When the respective text section has been printed, pawl 138 engages switch 139 and closes the same. Electromagnet 142 is energized by contact 141 and has its armature forwardly placed to engage pawl 138 so that pawl 138 is pressed into a notch of ratchet wheel 145 whereby pawl 144 is released, and permits ratchet wheel 145 with line cam 143 to turn a given angle until pawl 138 stops the angular movement of ratchet wheel 145. The angular displacement of ratchet wheel 145 and line cam 143 is effected by a spiral spring corresponding to spring 45 of FIG. 3.

The line cam 143 is now in a position in which the next following line or text section of the master is printed on the card 5.

Closing of switch 139 near the end of the respective revolution of the printing drum 6, starts the transport of record carrier tape 124, so that a section of perforated tape 124 corresponding to the printed line or text section is read out by read-out device 128*a*. When pawl 138 releases switch 139 so that the same opens again, reading out is continued due to holding circuits, not shown, of the read-out device until a control perforation 155, indicating the end of the respective section of perforated tape 124, is read out. During longitudinal movement of tape 124, several short transverse lines of perforations of tape 124 are successively read out to obtain the same information as contained in a line of the printing master.

In the event that a perforated tape is newly inserted into the read out device 148, the control perforation 151 is first read out and produces a clearing impulse transmitted through cables 149 and 150 to the storage and punching device 152, 153 causing a clearing of the same from information regarding the head section and the last line section or sections of the preceding record carrier tape.

An impulse produced by control perforation 151 also causes transport of perforated tape 124 so that the section of the same between control perforation 151 and a series of control perforations 154 is read out. In this section, information regarding the head section of the master sheet is punched in several transverse lines so that information concerning the head section passes through decoder 128*a* and cable 149 and is stored in the storage means of the punching device part 152.

When the series of control perforations 154 is read out, read-out device 128 is switched to cable 150 and to the storage means of punching device part 153 and stores in the same information concerning the first line of the master sheet represented by punched holes in transverse lines of a section of tape 124 located between the series of control perforations 154 and the control perforation 155.

In this manner, information regarding the first line or text section of the text of the master sheet is read out and the punching device part 153 set to punch corresponding information into punch card 5 which after being printed with the same information under control of line cam 143, was supplied to the punching device 129 in FIG. 10. When control perforation 155 is read out in the read-out region 156, the perforated tape 124 stops. When the first line or text section of the master is printed by printing drum 6 on card 5, the punching device 153 is already set to punch the same information into card 5.

Shortly before the end of the revolution of printing drum 6, switch 139 is closed, and the punching device 153 is cleared, whereupon perforated tape 124 is transported so that the next following line of the text section is entered into punching device 153 which is thus ready to punch the next line of the text of the master into a card 5 which has been imprinted under the control of the line cam 153, shifted as explained above to cause the counterpressure roller to print the second line. Since the head section of the text is stored in the storage means of punching device part 152, information representing the head section of the text will be punched in every punch card 5 in addition to the varying information regarding successive lines of the text.

It may be noted that in the embodiments described with reference to FIGS. 1 to 9, a new record carrier 3 consisting of folded cards also has a section representing the head section of the text of the master sheet. Referring to FIG. 9, when a new record carrier 3 is inserted, the information regarding the head section is read out by read out brush means 10 and supplied to the punching device 13 in which switch 168 is shortly actuated. Relay 169 is energized and connects all read out brushes 10 with the amplifiers 102, 102*a* and electromagnets 103, 103*a* of the punching device 13. When read out brush means 10 passes over record carrier 3, the punch control members 100 are set as described above in accordance with the control perforation 101 which indicates the transition between two card sections of record carrier 3. When the information regarding the head section of the text is read out, actuating roller 110 operates switch 156, see FIG. 6, so that relay 169 is de-energized and switches the read-out brushes 10 back to the punching device 13 for punching information regarding lines of the text. After record carrier 3 has moved one step as explained above, punching device 13 is set for punching the first line of the text in accordance with the perforations on record carrier 3 under the control of amplifiers 102*b*, 102*c*, and electromagnets 103*b*, 103*c*. In the embodiment

of FIGS. 10, 11, switch **168** performs the function of connecting the read-out device **128** with the storage device of the punching device part **152** for punching the head section, while switch **156** performs the function of connecting the read-out device with the storage of the punching device part **153** for line sections.

In accordance with the present invention, the same information is recorded on a master and on a record carrier which may be a folded series of punched cards, or a perforated tape. It is convenient and practical to store corresponding masters and record carriers together. However, the record carriers **3** consisting of folded cards are bulky, and record carrier tapes **8** are far longer than a master carrying the same information in legible form.

In accordance with the modified arrangement of the invention illustrated in FIGS. 12 to 15, this disadvantage is overcome by reducing the length of the record carrier to half the length required for the above described record carriers.

The punched holes representing information regarding a head section or a line section, are divided into two coded groups which are placed adjacent each other in two longitudinal halves of the record carrier.

Consequently, as compared with the record carrier tape **124** shown in FIG. 11, each longitudinal section of the perforated tape required for a line of the text will be twice as long for a tape **124** than for a tape **170** as shown in FIGS. 12 and 13.

FIG. 13 shows a central row of transporting holes **182** dividing the tape into two longitudinal halves. The information relating to the head section is punched between the transverse rows of control perforations **188** and **186**, and the information relating to the first line of the text is punched between rows of control perforations **186** and **187**.

Twenty positions are assigned to the head section, but are divided into two series of odd and even numbers **185**. In each half section four code positions **183** and **184** are provided. Positions **183** and **184** determine the values of the perforations. Positions **185** determine the sequence within the respective section of the text, and the sequence of the head and text sections.

When the row of control perforations **188** is placed in the read-out device transporting means are started so that the perforations in positions 1 to 19 and 2 to 20 are read out by two brush means **172**, **173**. The row of control perforations **186** effect a shifting from the storage of the head section to the storage of the first line section, and also transport of the tape to the next row of control perforations **187** which cause the read-out device to stop. However, it is possible to substitute a row of control perforations **187** for the row of control perforations **186** so that the reading out is stopped after the head section has been read out. The switching of the read-out device from the head section storage and punching device **152** to the line section storage and punching device **153** can in this case be effected by switch **156** as explained in reference to FIG. 9.

Referring now to FIG. 12, typewriter **123** produces simultaneously a master sheet **1** having a head section and a series of lines or text sections, and controls a punching device **171** for punching a record carrier tape **170** in the manner described with reference to FIG. 13. The printing drum **6** prints successively on copy sheets **5** a head section and also a selected line section so that copy sheets or cards **5** are imprinted with different information and supplied to the punching device **129**. The same information is read out by the read out brushes **172** and **173** in the two halves of the record carrier tape **120**, and the information is transmitted from read-out or sensing device **148** through cables **174** and **175** to a distributor **176** which supplies the information to punching device **129** and to a checking device **179**. When a card **5** with a particular line section of the text printed thereon arrives in punching device **129**, the same is ready to punch the same information into card **5**. The punched card is read out by a read-out device **180** which supplies the information through a cable **181** to the checking device **179** so that an error of the punching device **129** is immediately detected and the machine is stopped.

FIG.14 illustrates the details of the apparatus shown in FIG. 12, certain parts previously described with reference to the other embodiments of the invention, being omitted for the sake of simplicity. The master **1** is attached by holding means **132** to the printing drum **6** which cooperates with a counterpressure roller, not shown, of duplicating machine **206** so that a line section or head section is printed on the card **5** whenever a cam follower is actuated by the line cam **143**, or by a head cam, not shown. A one revolution clutch as previously described, connects shaft **21** with printing drum **6** which drives a stepping mechanism **207** including a wheel **133** carrying pawl means **138**, **144** through gears **134**, **135**, **136**. While the printing drum performs a revolution in the direction of the arrow for printing on a card, pawl wheel **133** turns in the direction G. Switches **140**, **141** are closed so that electromagnet **142** is in an actuated position for engaging pawl **138** and pressing the same into a notch of ratchet wheel **145** when the revolution of printing drum **6** is almost completed. Pawl **144** is released momentarily, and ratchet wheel **145** turns an angular step together with line cam **143**, as previously described, so that during the next following revolution of the printing drum, the next card is imprinted with a different line of the text of the master **1**. Near the end of the revolution, pawl **138** engages and closes switch **139** which starts the reading out of transverse lines of record carrier **170** in longitudinal direction by the two sets of four brushes **172**, **173**, assuming that one row of control perforations **186** is located in the read out line **189**. FIG. 14 shows an intermediate position in which a head section between control perforations **188** and **186** is being read out.

When the printing drum **6** turns further, pawl **138** releases switch **139** which opens, but the read-out operation of read-out device **148** is continued until the row of control perforations **187** reaches the read-out line **189** and causes stopping of the transporting means of the read-out device for tape **170**.

Assuming that a new record carrier is to be placed in the read-out device, the information stored in punching devices **152** for the head section and **153** for the line sections is first cleared, as explained in reference to FIGS. 6 and 7. The tape is inserted into the read-out device until the first row of control perforations **188** is located in the read-out line **189** and causes starting of the transporting means of the read-out device **148** so that the two sets of brushes **172** and **173** simultaneously read out the lines of punched information provided in the two halves of the section of the tape between the rows **188** and **186** referring to the head section of the master.

Impulses representing the read out information are transmitted through cables **174**, **175** to a distributor **176** which will be explained hereinafter with reference to FIG. 15 and pass through a decoder **200**, not shown in FIG. 12, and cable **149** to the storage and punching device **152** for the head section. Cables **149** and **150** correspond to cable **177** in FIG. 12.

When the row of control perforations **186** is read out, the distributor shifts the read-out device **148** to cable **150** and to the storage and punching device part **153** of punching device **129** for lines, since the following section of the tape has perforations representing the information of the first line of the text. When control row **187** is read out, the transporting means of tape **170** stop.

When during a revolution of printing drum **6** the first line is printed under control of line cam **143**, preferably together with a head section under control of head cam, not shown, the printed card **5** is punched with the information stored in storage and punching device parts **152**,

153 of punching device 129. Shortly before the end of the revolution of printing drum 6, switch 139 is closed, and the information concerning the respective line of the text stored in storage and punching device part 153 is cleared, while record carrier tape 170 is transported, and the information punched into the next section of the record carrier tape and concerning the next following line of the text, is stored in storage and punching device part 153.

I a modified arrangement, the row of control perforations 186 is replaced by a row of control perforations 187 causing stopping of the transport of record carrier tape 170 after reading out of the head section. Switch 168, described with reference to FIG. 9, is used for switching the read-out device 148 from storage and punching device 152 to storage and punching device 153.

Distributor 176 is shown in greater detail in FIG. 15. The distributor has a contact arm 190 with two contacts 197 and 198 and secured to a shaft 196 driven by a motor 192. Contact arm 190 cooperates with two sets of stationary contacts 193, 194 arranged in concentric circles and being successively engaged by contacts 197, 198 during rotation of contact arm 190. Contacts 197 and 198 are respectively connected with the sets of brushes 172, 173 of the read-out device 148, and the record carrier tape 170 is transported along a conductive plate 199 under brushes 172, 173. Contacts 193, 194 are connected with the decoder 200.

Switch 139 is operated during rotation of printing drum 6 by pawl 138, as described with reference to FIG. 14. The circles at the end of lines in FIG. 15 indicate one terminal or a voltage source whose other terminal is connected to ground as schematically indicated by a transverse bar at the end of a line. While record carrier 170 is transported along the support plate 199 under the brushes, the reading out of control perforations on the record carrier, motor 192 is also started. Since record carrier 70 has four code elements, and since for each line or text section of the text, no more than 20 positions are provided, contact plate 191 has 40 stationary contacts 193 and 40 stationary contacts 194 which are respectively aligned and uniformly distributed along the circumference of plate 191.

The rotary speed of contact arm 190 is selected so that when sets of brushes 172 and 173 read out two adjacent section halves of record carrier 170, contact arm 190 passes over four stationary contacts 193 and four stationary contacts 194 and connect the same to the voltage source. The information is given in the form of electric pulses to the decoder 195, and the decoded information is transmitted to a storage device in one of the storage and punching devices 152, 153.

Contact arm 190 performs a complete revolution during the reading out of a record carrier section associated with the head section or a line section of the text so that contact arm 190 is in an initial position when the reading out of the next following line section is started.

Referring again to FIG. 13, it will be seen that the head section, and each text section of the master is associated with a section of record carrier 70 consisting of two section halves located adjacent each other, the information being represented in a code having four elements, as shown in FIG. 13, or five elements. The perforations are arranged in transverse lines uniformly spaced in the longitudinal transporting direction of the record carrier, but are also arranged in two transversely adjacent groups. The control of the transport of a record carrier between sections representing lines of the master, is accomplished by a combination of holes coded differently from the zero to nine representation.

The same number of adjacent and longitudinally consecutive positions of the record carrier is associated with each line or text section of the printing form, and the transporting means continue to transport the read out record carrier while unused portion of the same having no perforations pass under the read out brushes until the record carried is stopped by a combination of control holes which are not arranged in the zero to nine representation.

After a number of positions associated with the head section of the master, a particular combination of control holes, arranged in a code different from the numerical zero to nine representation, may be used for effecting the switching of the read out information between different storage and recording devices.

It is also possible to prevent by particular combination of holes in a code different from the zero to nine representation, the clearing of information stored in a storage device. This combination of holes follows the positions associated with one of the head section lines of the master.

The switching between different storage and punching devices for information concerning the head section and line sections may be accomplished by an electromagnet energized by a combination of perforations under the control of the read-out device.

By a combination different from the zero to nine representation, the clearing of a storage device, or of a unit of the punching device, may be prevented by electromagnetic locking means.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of apparatus for punching printed cards differing from the types described above.

While the invention has been illustrated and described as embodied in a printing and punching apparatus printing and punching on successive cards different sections of a text, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims.

I claim:

1. Apparatus for printing and recording on cards, comprising, in combination, a printing machine including printing means, a printing master having a series of text sections, and control means controlling said printing means to successively print different text sections of said printing master on cards successively supplied to said printing means; a read-out device including transporting means for transporting an elongated record carrier composed of a series of consecutive sections having recordings respectively representing the same information as said text sections, and read-out means for reading out said recordings; operating means connecting said control means with said transporting means so that said transporting means transport a section of said record carrier to said read-out means when said control means control said printing means to print the correlated text section of said master on a card; and a recording device receiving imprinted cards from said printing machine and being controlled by said read-out device to record on each card the information imprinted thereon by said printing means.

2. An apparatus as claimed in claim 1, wherein said printing means includes a printing drum supporting said master, a counterpressure roller cooperating with said printing drum, a cam rotating in synchronism with said printing drum and operating said counter pressure roller to move to a printing position for printing a text section;

wherein said control means turn said cam an angular distance corresponding to the spacing between two successive text sections of said master after each revolution of said printing drum so that successive text sections are printed on successive cards; and wherein said operating means include a transmission connecting said cam with said transporting means so that said record carrier is shifted by said transporting means to the next section when cam is shifted said angular distance.

3. An apparatus as claimed in claim 2, wherein said control means include a stepping device rotating in synchronism with said printing drum, and a stationary actuator for said stepping device operating the same to move said cam one angular step at the end of each revolution of said printing drum and stepping device; and wherein said transporting means include a transporting band for said record carrier and roller means for moving said transporting band, said roller means being connected with said stepping device for rotation.

4. An apparatus as claimed in claim 3, wherein said record carrier has transporting holes; and wherein said roller means has projections cooperating with said transporting holes.

5. An apparatus as claimed in claim 4, wherein said record carrier has a plurality of card portions adapted to be folded, each card portions having spaced transporting holes spaced a first distance, the first and last transporting holes of two adjacent card portions being spaced a smaller second distance; and wherein said operating means include another rotating stepping device, and a plurality of stationary actuators arranged in a circle and spaced from each other to actuate said other stepping device when the junction between two adjacent card portions passes through said read-out device, said other stepping device being connected with said roller means for turning the same an angular distance corresponding to said second distance so that the first section of a card portion is read out in synchronism with the angular displacement of said cam.

6. An apparatus as claimed in claim 5, comprising an actuator rotating in synchronism with said printing drum; a switch operated by said actuator at the end of each revolution of said printing drum; wherein said operating means include an electromagnetic coupling energized by said switch.

7. An apparatus as claimed in claim 6, wherein said stepping devices include spring motors; and comprising an electric windup motor connected with said stepping devices for winding up said spring motors.

8. An apparatus as claimed in claim 1, wherein said elongated record carrier has recordings arranged in transverse and longitudinal lines in accordance with the code; wherein said read-out means include a read out member mounted for movement transverse to the transporting direction of said transporting means; and including means connecting said control means with said read out member so that the same is moved in a read out motion along transverse lines of said record carrier; and wherein said recording device includes a means moving in synchronism with said printing drum so that said recording device simultaneously records successively read out information.

9. An apparatus as claimed in claim 1 and including locking means for locking said operating means so that recording operations can be repeated without the reading out of new information from said record carrier.

10. An apparatus as claimed in claim 9, and including electromagnetic means for actuating and releasing said locking means.

11. An apparatus as claimed in claim 1 wherein said record carrier has control recordings between said sections; and wherein said transporting means is stopped when said read-out means read out said control recordings.

12. An apparatus as claimed in claim 1 wherein said record carrier has a control recording representing clearing; and including means for clearing said recording device when said read-out means reads out said clearing control recording.

13. An apparatus as claimed in claim 12 wherein said record carrier has a control recording; and wherein said recording device includes a plurality of recording means, and means controlled by said read-out means reading said last-mentioned control recording to selectively connect said read-out means with said recording means.

14. An apparatus as claimed in claim 1 wherein said master has a head section and a plurality of line sections; wherein said control means control said printing means to print said head section and different text sections on successive cards; wherein said record carrier has a first longitudinal section having recordings representing the information of said head section, and successive following sections representing the information of said text sections; wherein said recording device includes a first storage means for storing the information of said head sections read out by said read-out means, and a second storage means for storing information regarding successive text sections readout from said following sections of said record carrier; wherein said record carrier has control recordings between said sections for connecting said read-out means with said first storage means while the first section of said record carrier is being read out, and for connecting said read-out means with said second storage means when the following sections of the record carrier are being read out; and wherein said record carrier has a control recording after each of said following sections for clearing said second storage means; and wherein said recording means includes clearing means for clearing said second storage means when said read-out means read out said last mentioned clearing control recording.

15. An apparatus as claimed in claim 1 wherein said recording device is a punching device; wherein said recordings of said record carrier are punched holes; and wherein said read-out means include brushes for reading out said perforations.

16. An apparatus as claimed in claim 1 wherein said record carrier is longitudinally divided into two halves so that each section of said record carrier consists of two half sections, coded recordings being arranged in longitudinal and transverse lines of each of said half sections; and wherein said read-out means includes first and second read-out means for respectively reading out said half sections of said record carrier, the information recorded in each pair of adjacent half sections representing the same information as a corresponding text section of said master.

17. An apparatus as claimed in claim 16 wherein said recordings of each longitudinal half of said record carrier are arranged according to a code having less than ten elements on the corresponding number of longitudinal lines; and including a decoding device connecting said read-out device with said recording device.

18. An apparatus as claimed in claim 17 including a transverse row of control recordings between successive sections of said record carrier and separating two pairs of longitudinal half sections, said control opening being arranged in a coded combination having less than ten code elements; and wherein said read-out device includes means controlled by said read-out means reading out said control recordings to actuate said transporting means to transport said record carrier until the next following row of control recordings is read out.

19. An apparatus as claimed in claim 18 wherein each pair of half sections of said record carrier has the same number of transverse lines of recordings representing different text sections of said master, and wherein at least one control recording effects stopping of said transporting means.

20. An apparatus as claimed in claim 16 wherein said recording device includes storage means; and wherein said read-out members simultaneously enter read-out information into said storage means.

21. An apparatus as claimed in claim 16 wherein said recording device includes first and second storage means; wherein said record carrier has a pair of half sections with recordings representing a head section of the master, and a plurality of consecutive pairs of half sections representing information of text sections of the master; wherein said record carrier has control recordings between adjacent pairs of half sections; said read-out device including means controlled by said read-out means reading out said control recordings to store the information contained in the pair of half sections representing the head section in said first storage device, and the information contained in the following pairs of half sections representing text sections of the master in said second storage means, said control recordings including a control recording for clearing said second storage means after the respective pair of half sections representing a text section has been read out.

22. An apparatus as claimed in claim 21 and including a distributor connecting said read-out device with said first and second storage means for distributing the information to the same.

23. An apparatus as claimed in claim 22 wherein said distributor includes a rotary contact arm, and stationary contacts arranged in a circle to be successively engaged by said contact arm, the number of said stationary contacts being the same as the number of positions provided for recordings in each pair of half sections.

24. An apparatus as claimed in claim 22 and including an electromagnet and a switch for connecting said read-out device with said first and second storage means, respectively.

25. Apparatus for printing and recording on cards, comprising, in combination, a printing machine including printing means, a printing master having a series of printing lines, and control means controlling said printing means to successively print different printing lines of said printing master on cards successively supplied to said printing means; a read-out device including transporting means for transporting an elongated record carrier composed of a series of consecutive sections having recordings respectively representing the same information as said printing lines, said recordings forming a plurality of rows in each section, and read-out means for reading out said recordings; operating means connecting said control means with said transporting means so that said transporting means transport a section of said record carrier to said read-out means when said control means control said printing means to print the correlated printing line of said master on a card, and then effect relative movement between said record carrier and said read-out means for effecting reading out of said rows of recordings in the respective section; and a recording device receiving imprinted cards from said printing machine and being controlled by said read-out device to record on each card the information imprinted thereon by said printing means.

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