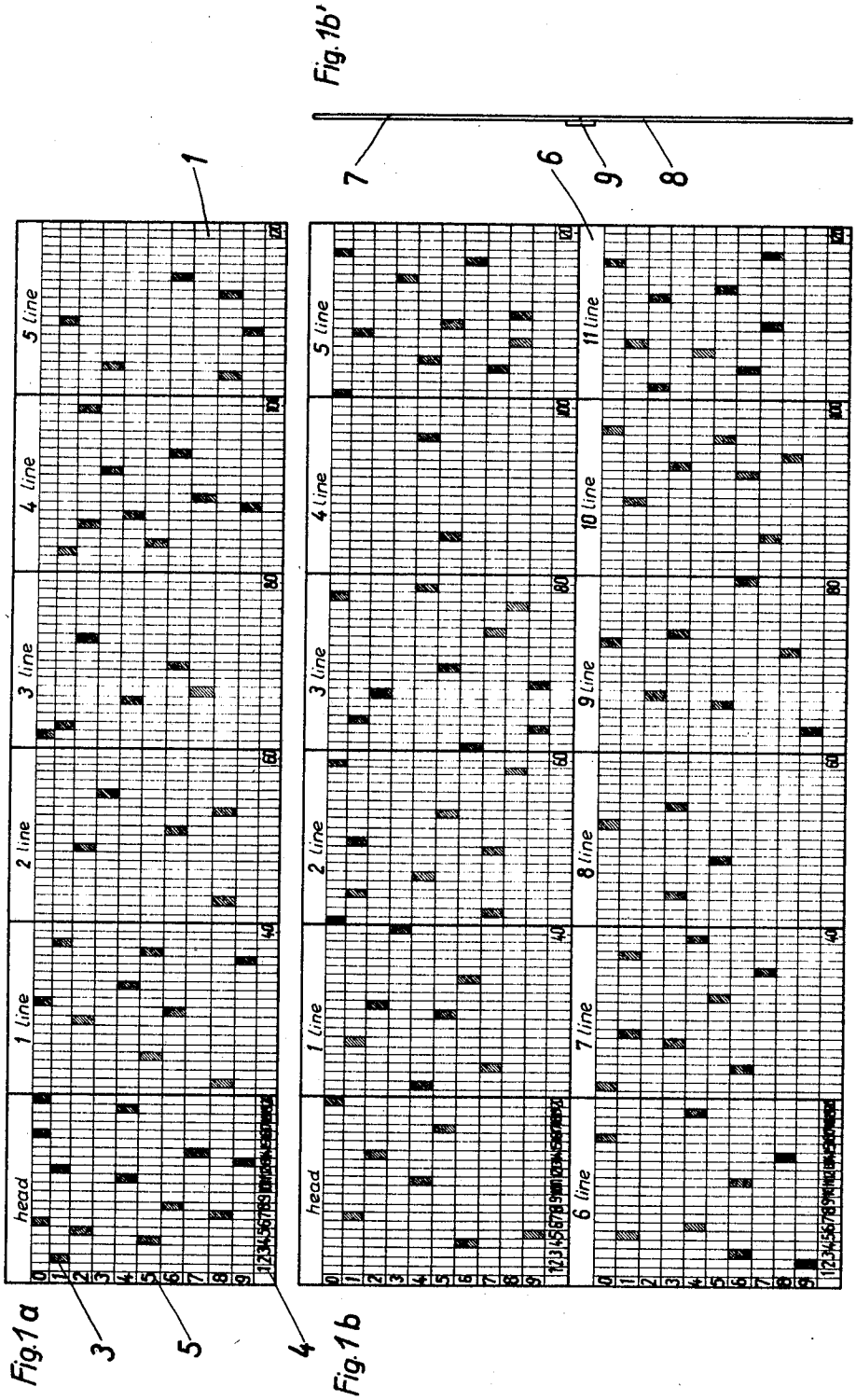
June 2, 1970 G. RITZERFELD 3,515,061

APPARATUS AND METHOD FOR PRINTING AND RECORDING ON THE SAME COPY SHEET

Filed Feb. 23, 1967 12 Sheets-Sheet 1



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Fig.2c

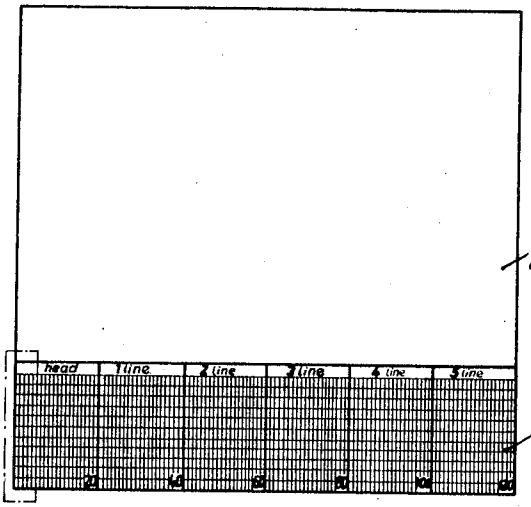


Fig.2c'

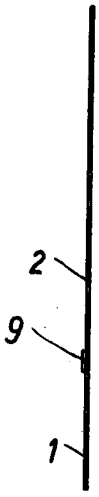


Fig.2c''

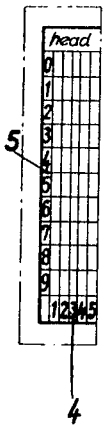


Fig. 2 d

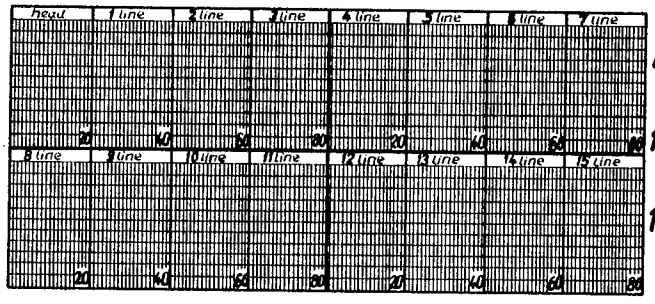


Fig.2d'



Fig.2e

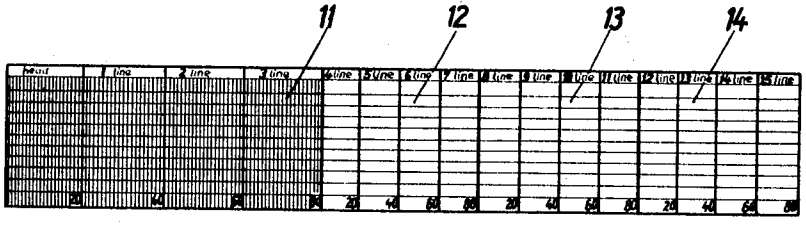
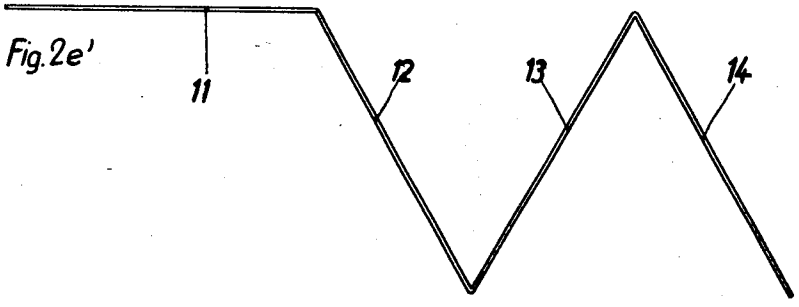
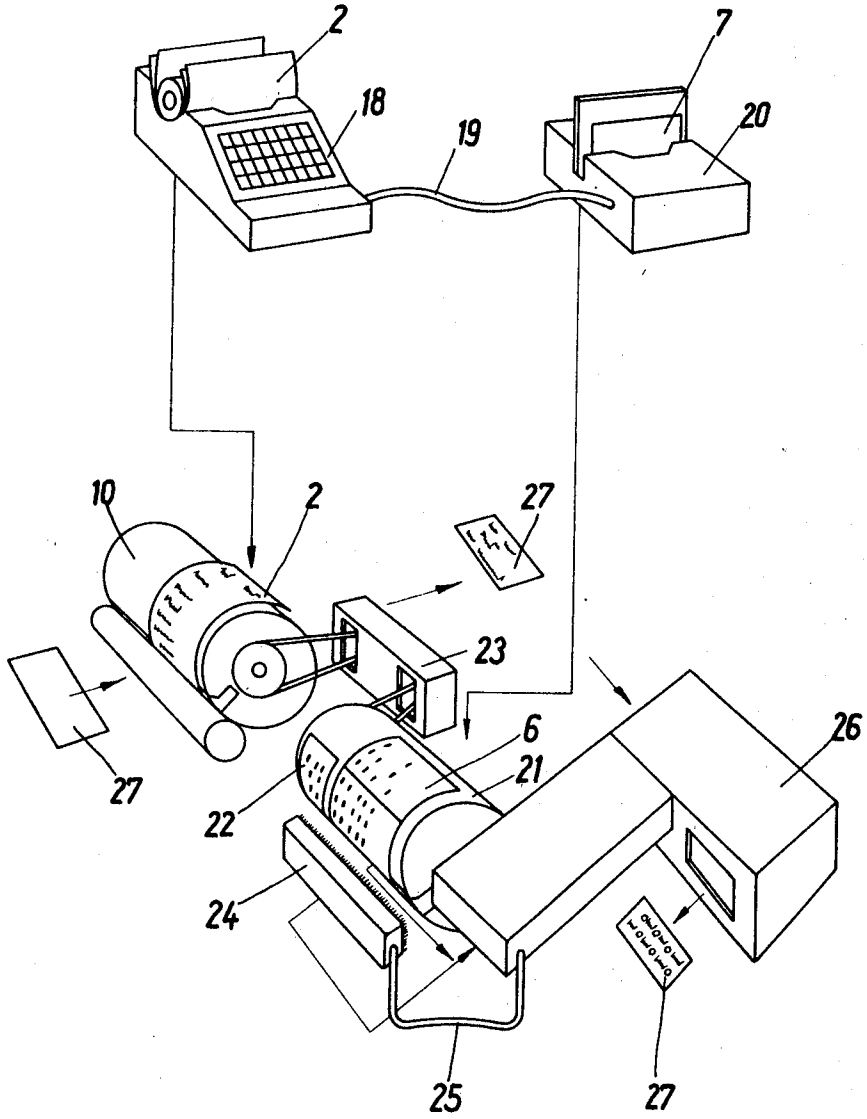


Fig.2e'



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Fig.3



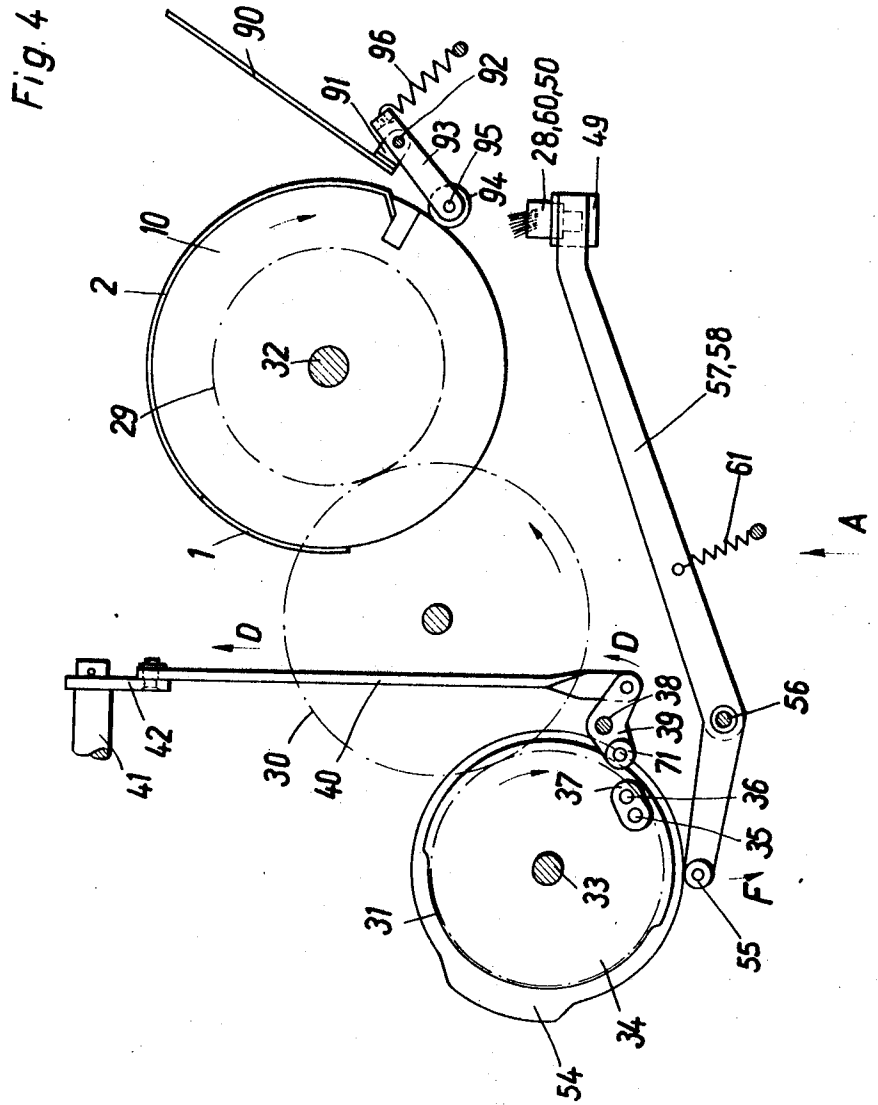
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Fig. 4



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Fig. 5

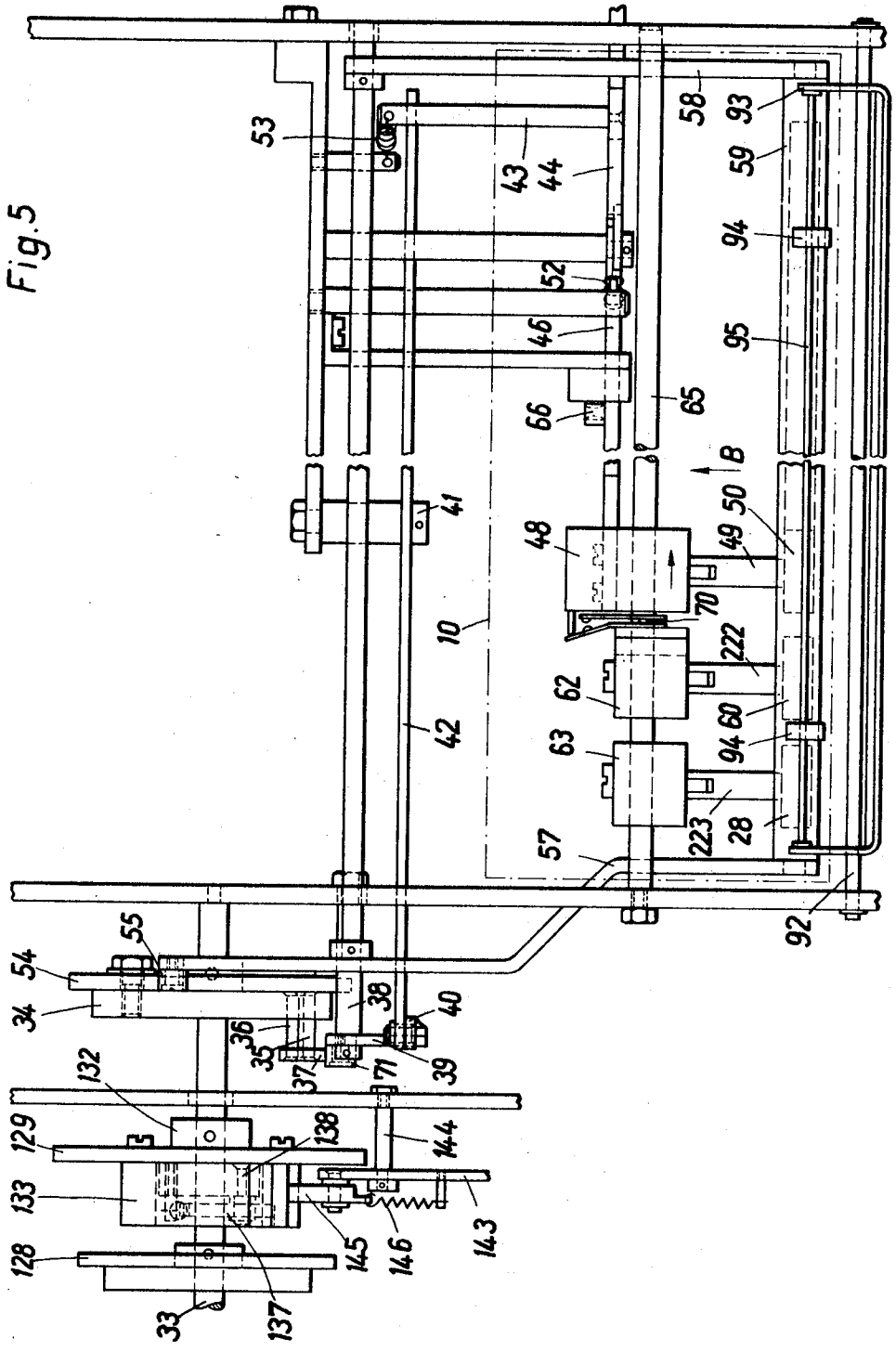


Fig.6

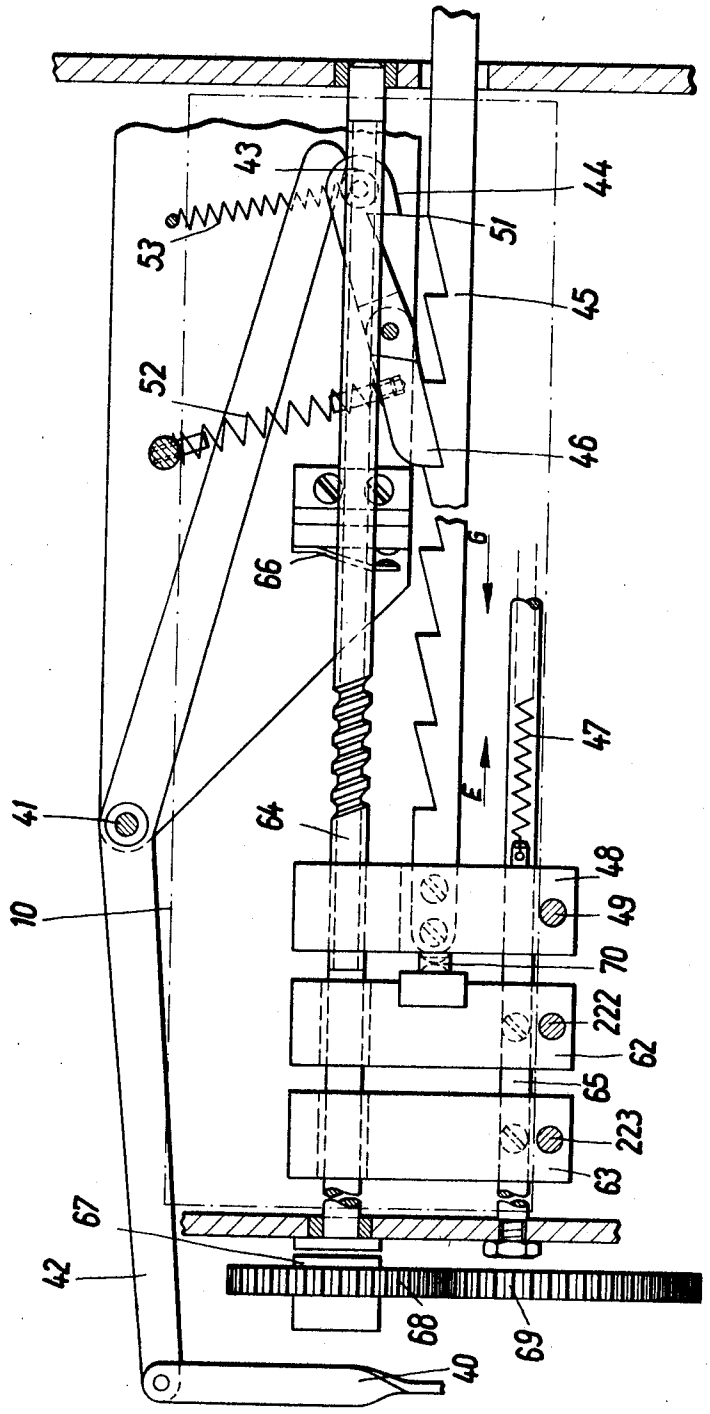
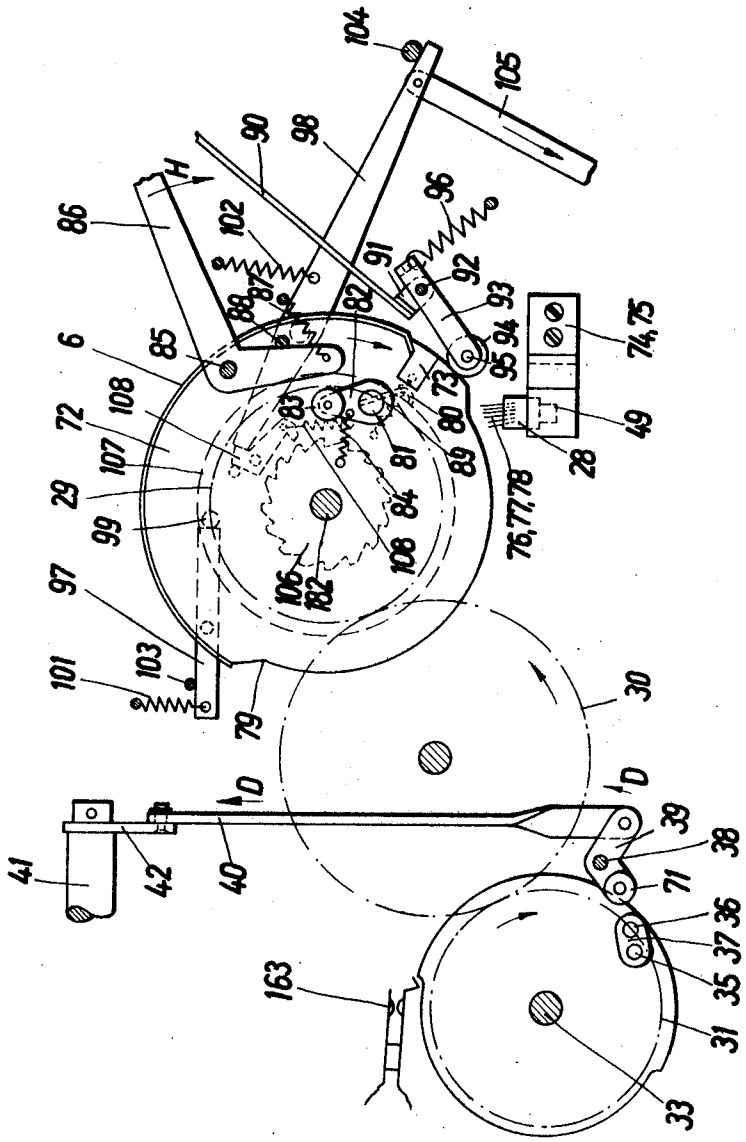

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Fig. 7

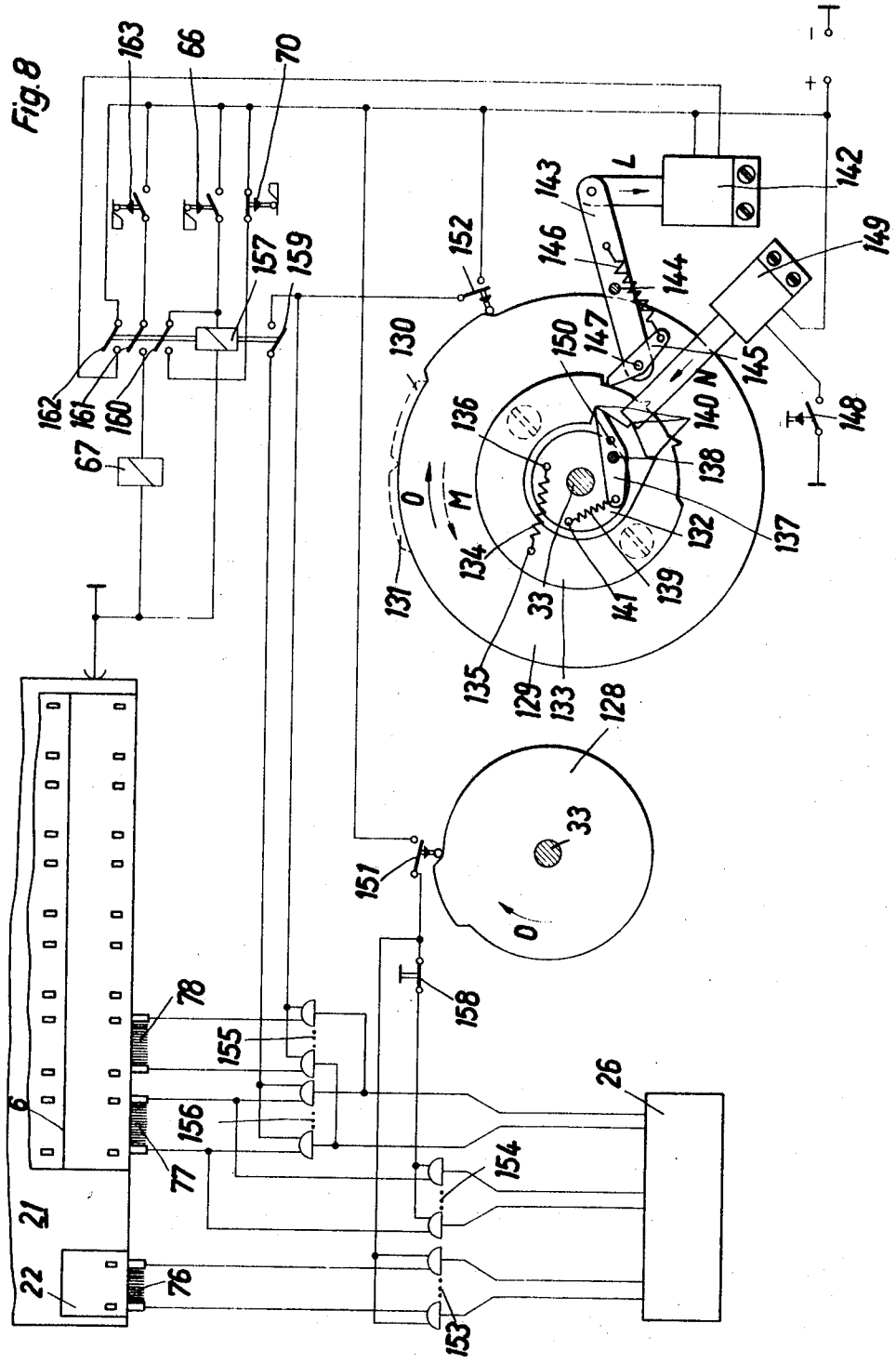

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Fig. 8



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Fig.9

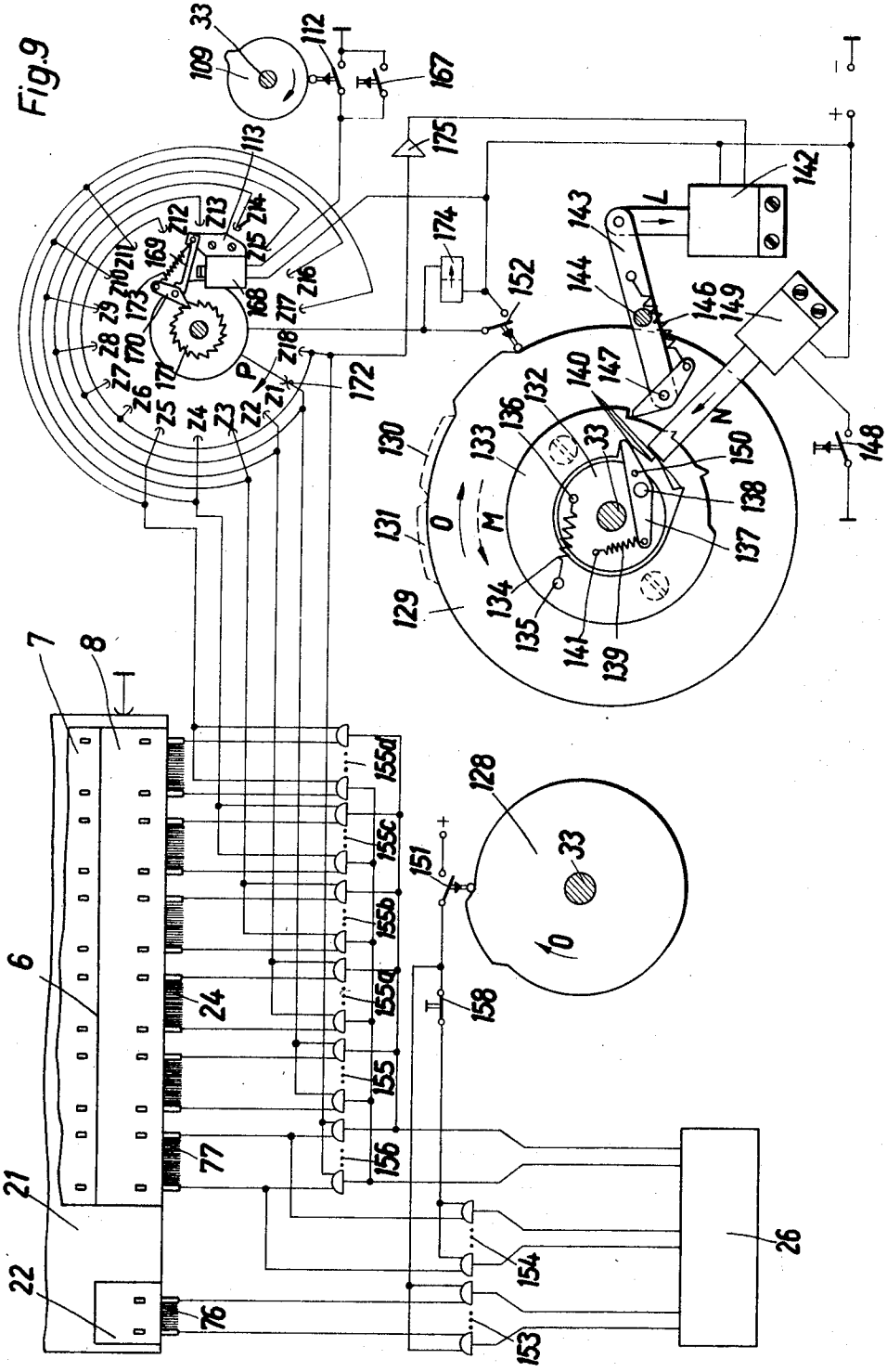


Fig. 10

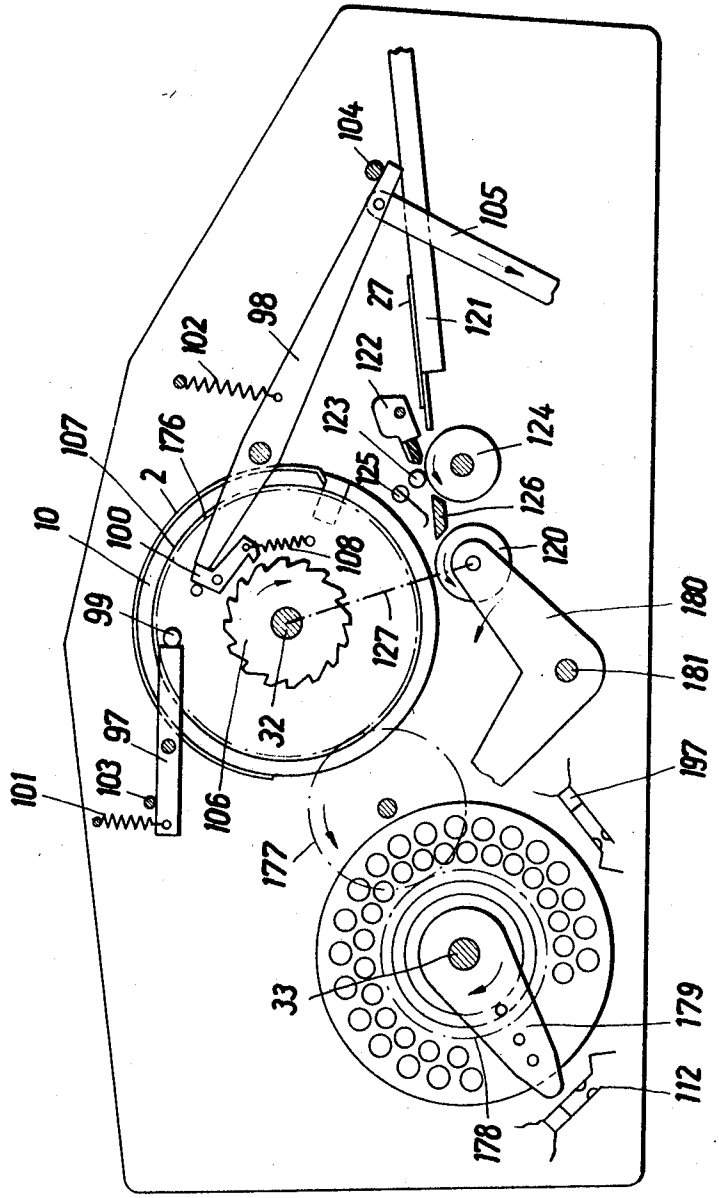
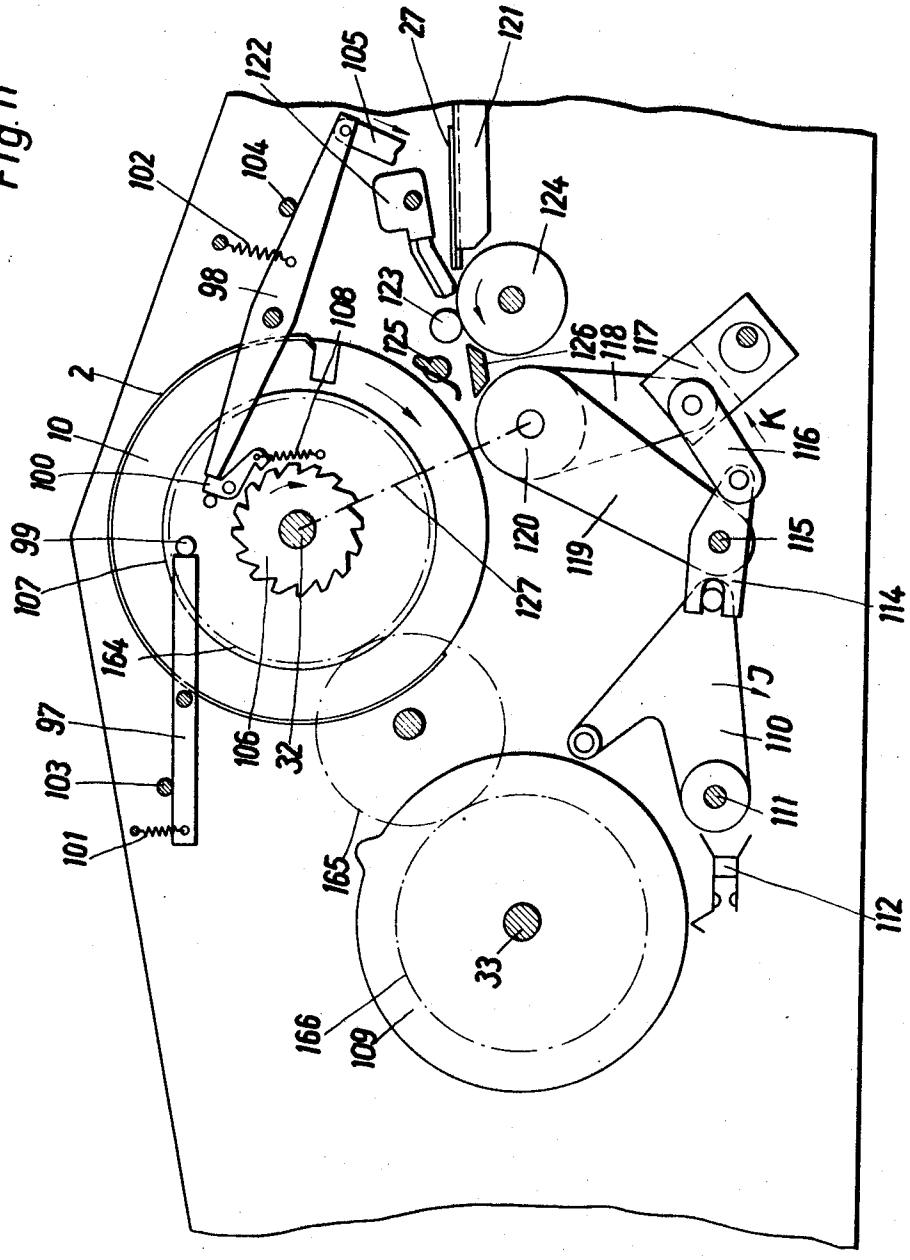

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Fig. 11

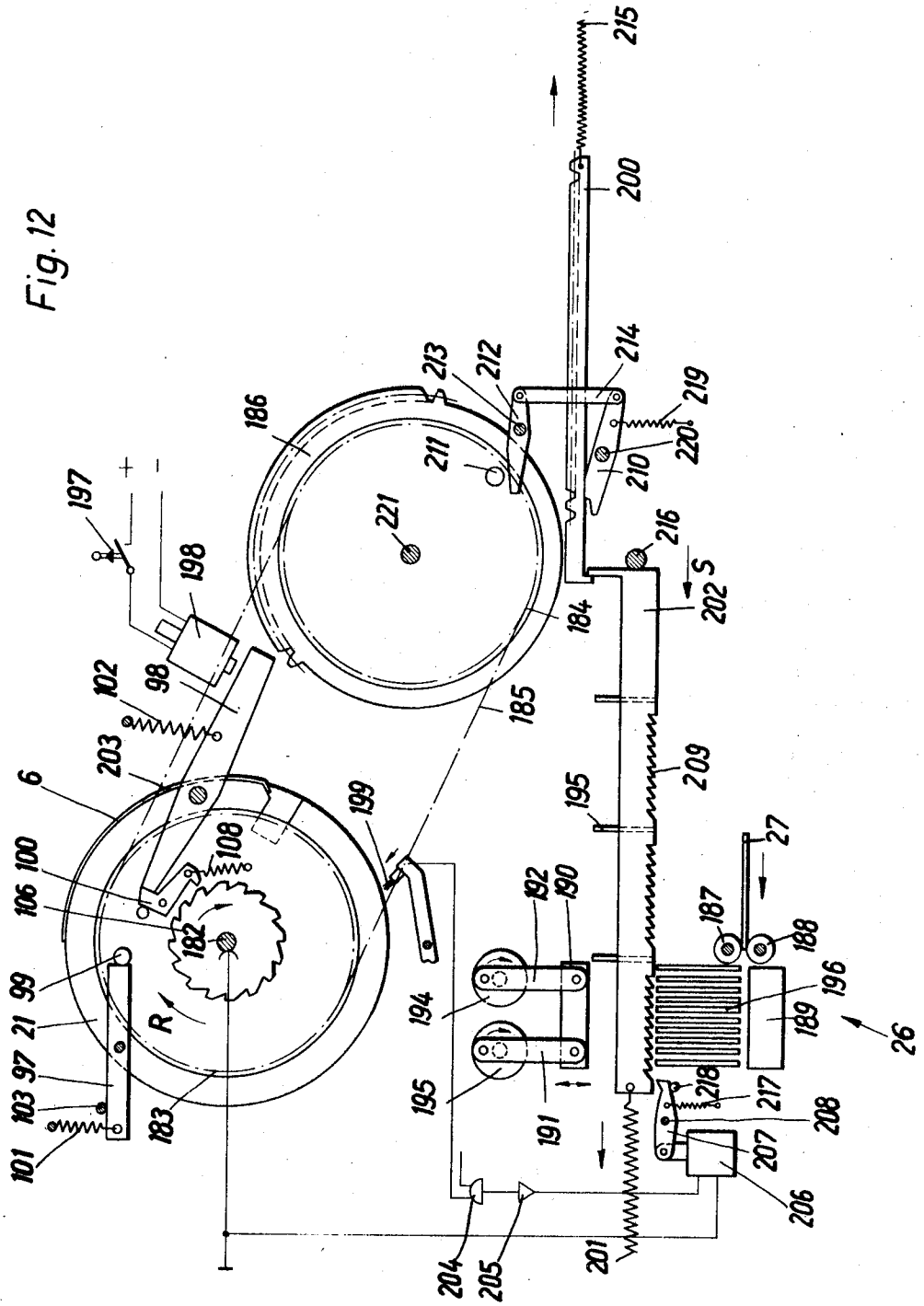

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Fig. 12



United States Patent Office 3,515,061 Patented June 2, 1970

3,515,061

APPARATUS AND METHOD FOR PRINTING AND RECORDING ON THE SAME COPY SHEET

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Filed Feb. 23, 1967, Ser. No. 621,723
Claims priority, application Germany, Feb. 24, 1966, R 42,667
Int. Cl. B41j *11/00;* B41l *47/46*
U.S. Cl. 101—91 34 Claims

ABSTRACT OF THE DISCLOSURE

A master card having fields of crossing lines and columns is punched to represent in each field the information contained in a correlated text section of a printing form. Copy sheets, such as cards, are imprinted by selected text sections of the printing form, and punched under the control of groups of sensing means correlated with the fields in such a manner that each sensing means senses a line of the respective field so that the copy sheet is imprinted and punched to represent the same information.

CROSS-REFERENCE TO RELATED APPLICATIONS

My copending applications Ser. Nos. 583,506 and 584,048 disclose an arrangement related to and improved by the present invention.

BACKGROUND OF THE INVENTION

The present invention relates to apparatus for punching cards to represent information contained in a text.

In apparatus according to the prior art, cards or other copy sheets can be imprinted with selected text sections of a printing form, such as the head sections and selected lines. Printed information regarding specific orders, for example, had to be visually read on the card, and manually punched into the same. The reading of the information, and the punching of the card by the operator, leaves a margin for error so that another person is required for checking the punched card. This operation is not only time-consuming, but also expensive since, in addition to the operator of the duplicator or other printing machine, personnel for punching and checking of the card is required.

In my copending application Ser. No. 584,048 entitled "Method and Apparatus for Printing and Recording on a Card," a card is imprinted and punched with the same information, but the operation cannot be carried out under the control of master cards having crossing lines and columns of recording areas into which holes may be punched, for example.

SUMMARY OF THE INVENTION

It is one object of the invention to provide an improved method and apparatus for automatically printing and recording the same information on a copy sheet, such as a card.

Another object of the invention is to provide a method and apparatus for producing a printed and punched card in a particularly economical manner.

Another object of the invention is to automatically provide printed cards during or after the printing operation with recordings, such as punched holes which partly or completely correspond to the printed information.

With these objects in view, one method of the invention comprises making a printing form having text sections; making recordings on a record carrier having a plurality of fields respectively correlated with the text sections, each field having crossing lines and columns of recording areas so that different positions of the recordings in said lines represent different values, and different positions of the recordings in the columns represent different information regarding the values; printing text sections of the printing form on copy sheets; sensing recordings on the record carrier in the areas of the lines of each field correlated with a printed text section; and recording on the copy sheets the sensed information so that any one copy sheet has the same information printed and recorded thereon.

One embodiment of an apparatus of the invention comprises printing means, for example a selective duplicator, for printing text sections of a printing form on copy sheets; carrier means, for example a rotary carrier drum, for supporting at least one record carrier, such as a punched master card, which has a plurality of fields, respectively correlated with the text sections, and wherein each field has crossing lines and columns of areas with recordings whose positions in the lines represent different values and whoes positions in the columns represent information related to the values; one group of sensing means shiftable for sensing said fields, or a plurality of groups of sensing means selectively operable for sensing selected fields, the sensing means of a group being disposed and operable for sensing in respectively correlated lines of the respective sensed field, recordings in the areas of the respective lines; control means connecting the printing means with the sensing means and controlling the latter so that only fields correlated with printed text sections are sensed; and recording means, preferably a punching device, controlled by the operative group of sensing means to make on a copy sheet imprinted with at least one text section by the printing means, recordings representing the same information as the printed text section.

In accordance with the invention, all or a part of the data to be printed are recorded, for example punched, on a record carrier, preferably a master card which has the same width, but a different length than standard punched cards so that it may be bent into accordion pleats for handling.

The master card has a plurality of fields respectively correlated with text sections of the printing form, and each field has a plurality of lines for registering data in the form of punched recordings.

The printing form is mounted on the drum of a duplicating machine, and the master card is sensed by a mechanical, electrical, optical or magnetic sensing device disposed in the duplicating machine or cooperating with the carrier of the master card. The sensing motion takes place along the master card in the direction of the values of the recorded data by sensing means correlated with lines of each field of the master card. Corresponding to the data contained in lines of the printing form, the sensing means form electrically, mechanically or electromechanically con nected groups, for sensing the field of the master card correlated with a printed text section. The sensed information is supplied to punching means which always punch the same portion of the copy sheet, irrespective which field was sensed.

In accordance with the invention, a fixed group of sensing means is provided which is associated with the head section of the printing form, while fields of the master card related to different lines or text sections of the printing form are selectively sensed to control the punching device of the copy sheet.

In accordance with a modification of the method of the invention, two cards of standard length are attached to each other with the fields and lines of the fields transversely aligned so that the successively operative groups of sensing means can be used for sensing the lines of transversely aligned fields.

The master card may be attached to the printing form, and secured with the same to the drum of a duplicating machine so that during rotation of the drum, the copy sheet is imprinted and punched. The different groups of positions sensed by different groups of operative sensing means, are transferred to unchanging positions of the punching device which punches the copy sheet.

In the preferred embodiment of the invention, the master card is mounted on a rotary carrier cylinder cooperating with groups of sensing means, and the rotary motion of the carrier cylinder is in synchronism with the entry of the values into the punching device so that the carrier cylinder and the master card assume the same position before each selection of a text section.

An additional master card having varying information may be attached to the carrier cylinder in addition to the main master card which has the recordings corresponding to the text sections. The additional master cards is sensed simultaneously with the master card, and its information transferred to the punching device.

In order to gain more time for the transport of the printed copy sheet or card to the punching device which is controlled by the punched master card, the selective sensing of recorded information corresponding partly or completely to the text information of the printing form may be delayed one or several operations of the duplicator in relation to the printing operation, and the sensing and transfer of the values in the master cards to the punching device is only carried out when the imprinted card is directly before, or already in the punching device. The sequence of printed and punched cards is, of course, maintained.

In one embodiment of the invention, the sensing device has a number of sensing means corresponding to the maximum number of positions or lines of the master card, and depending on the movements of the means controlling the successive printing of text sections, groups, of the sensing means are successively electrically actuated.

In a modified embodiment of the invention, a sensing device which is shitable to different sensing positions or sensing different fields of the master card is provided and controlled in accordance with a selection of text sections of the printing form in the duplicating machine.

In another embodiment of the invention, the duplicating drum is used partly as carrier for the master card, and sensing means cooperate with the duplicating drum and are successively shifted in the direction of the axis of the duplicating drum.

The rotary carrier cylinder of the master card, or the duplicating drum, may be connected with a rotary contact means which renders the sensing means operative only during passage of a predetermined segment of the periphery of the carrier cylinder corresponding to the height of the field of the master card.

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 includes FIG. 1*a* illustrating a master card, and FIGS. 1*b* and 1*b'* which are front and side views of a modified master card;

FIG. 2 includes FIG. 2*c* and FIG 2*c'* which are front and side views of a master card combined with a printing form, FIG. 2*c''* which illustrates a portion of FIG. 2*c* on a larger scale, FIG. 2*d* and FIG. 2*d'* which are front and side views of another master card, and FIGS. 2*e* and 2*e'* which are front and side view of an accordion pleated card of which the master car of FIG. 2*d* and *FIG.* 2*d'* is made;

FIG. 3 is a schematic perspective view illustrating an arrangement for carrying out the method of the invention;

FIG. 4 is a fragmentary side view, partially in section, illustrating a duplicating machine and sensing means cooperating with a record carrier attached to the printing form in accordance with an embodiment of the invention;

FIG. 5 is a bottom view in the direction of the arrow A in FIG. 4 illustrating operating means for sensing means;

FIG. 6 is a fragmentary front view illustrating a mechanism for operating sensing means as viewed in the direction of the arrow B in FIG. 5;

FIG. 7 is a fragmentary schematic side view, partially in section, illustrating the mounting of a master card on a carrier in accordance with another embodiment of the invention including the mechanism of FIG. 6;

FIG. 8 is partly a schematic view, and partly a circuit diagram illustrating the electric control of the sensing means for reading out a master card;

FIG. 9 is partly a schematic view, and partly an electric diagram illustrating a modified electric circuit for controlling the sensing means of the master card;

FIG. 10 is a fragmentary side view, partially in section, illustrating a duplicator which can be combined with the carrier arrangement of FIG. 7;

FIG. 11 is a side view, partially in section, illustrating the modified duplicator which can be used with a carrier of FIG. 7; and

FIG. 12 is a fragmentary side view, partially in section, illustrating an arrangement for controlling the punches of a punching device for the copy sheet in synchronism with the position of the master card and in accordance with the information contained in the sensed master card.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIG. 3, a printing form, such as a duplicating master **2**, is made on a typewriter **18** which is connected by a cable **19** to a recording punch **20** which punches holes into a master card blank **7** representing the same information as is contained in the text of the printing form **2**. Instead of punch **20**, other recording means may be used to produce on the master cards recordings which can be optically or magnetically read out.

A printing drum **10**, which may be part of a duplicating machine, supports the finished printing form **2** which may have a head section and a plurality of text sections each text section consisting of one or several lines. A counterpressure roller cooperates with printing drum **10** so that a copy sheet blank **27** supplied to the printing drum **10**, is imprinted with the entire text, or with selected text sections of the printing form. The imprinted copy sheet, which may be a card of conventional dimensions, is then transported to a punching device **26**. The master card **6** is shown to consist of two portions of master card **7** laterally secured to each other, as will be described hereinafter with reference to FIG. 1*b* and FIG. 2*d*. An additional punched master card **22** is also secured to carrier **21**.

Transmission means **23** connect printing drum **10** with carrier **21** for rotation in timed relation, and while a belt and pulley transmission is shown, electrical or other mechanical transmission means may be provided. A sensing device **24** including a plurality of sensing means cooperates with the master card **6** and **22** to read out the punched information, and to supply the same through a cable **25** to the punching device **26** which is actuated to punch the read out information into the copy sheet or card **27** which has already been imprinted with a legible text. The reading out of the master cards by sensing means **24** takes place either during a simultaneous printing revolution of printing drum **10**, or one or several revolutions later than the corresponding printing revolution of the printing drum **10**.

Referring now to FIGS. 1 and 2, a master card **1**

shown in FIG. 1*a* has the standard transverse width of a punch card, but is longer than a standard punch card. The master card of FIG. 1*a* has six fields respectively associated with a head section and with the first five lines of the printing form **2**. The information contained in the head section of the printing form **2** is recorded by punched holes in the first field of master card **1**, and the information contained in the first text section or line of the printing form, is recorded in the second field of the master card.

Each field has ten longitudinal columns associated with the ten digits, as indicated at **5**, and twenty transverse lines indicated at **4** by numerals **1** to **20**. The next following field associated with the first line of the printing form has lines and columns arranged in the same manner, the lines being numbered **21** to **40** so that on the entire master card **1**, 120 lines are provided. A punched hole in any one of the digital columns represents a numerical value, while the line positions **4** determine the sequence and relation between the values.

The master card **6** shown in FIGS. 1*b* and 1*b'* consists of two cards **7** and **8** of the type shown in FIG. 1*a* connected along adjacent longitudinal edges by an adhesive strip **9**. While cards **7** and **8** can be successively punched in punch **20** which is adapted for cards of a standard width, master card **6** has double width after the two cards **7** and **8** are connected. The master card **6** permits the use of a printing form having eleven text sections in addition to the head section. The fields and lines of the two cards **7** and **8** are transversely aligned, and can be sensed in line direction by twenty sensing means forming a group for reading out one field of master card **1**, or two transversely aligned fields of master card **6**. FIG. 3 shows how punch **20** which is of limited width, punches the card **7**, whereupon the card **8** is punched in the same position. When cards **7** and **8** are combined to a double master card **6**, it can be mounted on the cylindrical carrier **21** and sensed by the sensing device **24** during rotation of carrier **21**.

While FIG. 3 shows a printing drum **10** with the printing form synchronized with a carrier **21** for the master card **6**, it is possible to attach a master card **1**, by an adhesive strip **9** to a printing form **2**, as shown in FIGS. 2*c*, 2*c'*, and 2*c''*. This is advantageous if the text of the printing form has only a small number of lines. As shown in FIG. 4 combined printing form **2** and master card **1** are mounted on the printing drum **10**, and first the printing form **2** is used to imprint a copy sheet **27** supplied on table **90** which is then supplied to a punching device, not shown, corresponding to punching device **26** in FIG. 3 and connected by a cable with sensing means **28**, **60**, **50**, shown in FIGS. 4 and 5. The punching device is operated to punch the imprinted copy sheet under the control of sensing means **28**, **60**, **50**, cooperating with the printing drum **10** and the master card **1** mounted thereon so that the copy sheet, which may be a card, is punched with the same information with which it was imprinted.

The card illustrated in FIGS. 2*e* and 2*e'* and used in the ebodiment shown in FIGS. 4 to 6, is very long and suited for a printing form having fifteen lines or text sections in addition to the head section. In order to handle a card of such length it is folded in accordion pleats, which are shown partly opened in FIGS. 2*e* and 2*e'* so that card portions **11**, **12**, **13** and **14** are superimposed. Since the card has conventional width it can be run through the punch **20** so that all fields of the card portions **11** to **14** are punched in accordance with the text sections of printing form **2**. Thereupon, the fold line between portions **12** and **13** is cut, and portions **13** and **14** forming a strip **17** and portions **11** and **12** forming a strip **16** are attached to each other by an adhesive strip **15**, as shown in FIGS. 2*d* and 2*d'*. In accordance with the invention, it is also possible to print master cards as shown in FIG. 1*b* and FIG. 2*b* and to punch the same in a special punching device, but the construction of composite master cards consisting of cards of standard width permits the use of a standard punch.

Referring again to FIGS. 4, 5 and 6, which are mainly provided for the illustration of the means for operating the sensing device, a printing drum **10** forming part of a duplicating machine is mounted on a shaft **32** which is connected by a gear train **29**, **30**, **31** to a control shaft **33** to which a cam wheel **34** and a cam **54** are secured. A cam member **37** is secured by pins **35** and **36** to the cam wheel **34**, and cooperates with a cam follower roller **71** on an angular cam follower **39** which is mounted for turning movement on a fixed pivot **38** and articulated to a link **40**. During each revolution of control shaft **33**, cam member **37** engages roller **71** and turns lever **39** in the direction of the arrow D so that the link **40** is raised in the direction of the arrow D to turn along angular shifting lever **42** about its stationary pivot **41**, as shown in FIG. 6, so that the free end of shifting lever **42** engages a stud **43** of a shifting pawl **44** and turns the same about its pivot so that pawl **44** engages a tooth of a rack bar **45**, while a locking pawl **46** is turned to release the rack bar. This operation of pawls **44** and **46** takes place against the action of springs **53** and **52**. A spring **47** is connected with a body **48** on which a sensing brush holder **50** is tiltably mounted by means of a rod **49**, see FIG. 5. When pawl **46** releases the rack bar, spring **47** moves body **48** in the direction of the arrow E together with rack bar **45** until the tooth **51** of shifting pawl **44** is engaged by a tooth of the rack bar. When cam follower lever **39** is released by cam member **37** during further revolution of control shaft **33**, springs **52** and **53** return the pawls **44** and **46** to the initial positions so that shifting pawl **44** releases rack bar **45**, while spring **47** pulls rack bar **45** until the next following tooth of the same abuts the return locking pawl **46**. The return shifting pawl **44** acts by its stud **43** on lever **42** to return linkage **40**, **39** to the normal position of rest.

Cam **54** on control shaft **33** cooperates with the cam follower roller **55** of a long lever **57** which is secured to a shaft **56** carrying another corresponding lever **58**, shown in FIGS. 4 and 5. An actuating shaft **59** is carried by actuating levers **57** and **58**, and supports sensing brush holders **28**, **60** and **50** so that the same are moved in radial direction toward the axis of shaft **32** on which printing drum **10** carrying printing form **2**, with an attached master card **1**, as shown in FIGS. 2*c* and 4, is mounted. Sensing brush holders **28**, **60**, **50** may also be operated by electromagnetic means under control of a switch operated by cam member **37**. Sensing brush holders **28** and **60** are mounted by means of guide rods **222** and **223** on fixed guide bodies **62** and **63**, while sensing brush holder **50** is mounted by means of guide rod **49** on the movable guide body **48**. When the lug of cam **54** passes cam follower roller **55**, spring **61** retracts actuating levers **57** and **58** with sensing brush holders **28**, **60** and **50**.

As explained above, guide body **48** is shifted stepwise under control of cam member **37** and moves with sensing brush holder **50** in axial direction of shaft **32** after each revolution of shaft **33**. The movable guide body **48** has a threaded bore meshing with the thread of a spindle **64**, which has a smooth cylindrical surface passing through bores in guide bodies **62** and **63**. Spindle **64** is mounted in frame walls of the machine for turning movement, and is connected by an electromagnetic clutch **67** to a pair of gears **68** and **69**, see FIG. 6, which are driven by drive means, not shown.

When the movable guide body **48** has been stepwise moved by spring **47** and pawls **44** and **46** to an end position engaging the contact arm of a limit switch **66**, a circuit which will be described in greater detail with reference to FIG. 8, is closed and electromagnetic coupling **67** is energized so that spindle **64** is rotated and drives the movable guide body **48** back in the direction of the arrow G in FIG. 6 until the sensing brush holder **50** is again in

its initial position in which guide body **48** engages and closes another limit switch **70**, see FIGS. 6 and 8 which causes deenergizing of the electromagnetic coupling **67**. During movement of rack bar **45** in the direction of the arrow G, locking pawl **46** slides on the back of the teeth of rack bar **45**.

As shown in FIG. 4, a master card **1**, as described with reference to FIG. 1*a* is secured to a printing form **2** as described with reference to FIG. 2*c*. A counterpressure roller, not shown in FIG. 4, and which may be operated as described hereinafter with reference to FIGS. 10 and 11, cooperates with the printing form **2** to cause printing of selected lines or text sections of the printing form, while during passage of the master card **1** through the region of the sensing brush holders **28**, **60** and **50**, the same are operated to move into sliding contact with master card **1** so that each sensing brush reads out the information punched in the respective associated line of the master card.

When a master card **6** of the type described with reference to FIGS. 1*b* and 2*d* is used, it is secured to the periphery of a cylindrical carrier **72** by a holding means **73**, as shown in FIG. 7. Cylindrical carrier **72** corresponds to carrier **21** shown in FIG. 3. The periphery of carrier **72** is recessed along a circumferential portion **79** so that sensing brushes **76**, **77**, **78** do not engage or slide on the peripheral surface of carrier **72** which is not covered by the master card **6**.

In the embodiment of FIG. 7, guide shaft **49** which carries sensing brush holders **28**, **60** and **50** is supported between two brackets **74** and **75** which are secured to lateral walls of the machine frame so that guide shaft **49** cannot be moved toward carrier **72**.

Master card **6** is secured by holding means **73** in an initial position of carrier **72** controlled by a one revolution clutch which will be described with reference to FIG. 11.

Holding means **73** can be opened by a member **80** secured to a shaft **81** mounted in carrier **72**. Shaft **81** carries a cam follower **82** with the roller **83** which is biased by a spring **84** to hold releasing member **80** in the illustrated position. A releasing lever **86** is mounted on a pivot **85** fixed to the frame of the machine, and when releasing lever **86** is turned in the direction of the arrow H against the action of spring **87**, releasing lever **86** engages roller **83** and turns arm **82** in counterclockwise direction so that releasing member **80** opens holding means **73** for releasing the master card **6**. When lever **86** is returned by its spring **87** to its initial position, the spring **84** turns releasing member **80** to permit closing of holding means **73** by spring **89**.

The printing drum **10** shown in FIG. 4, and the cylindrical carrier **72** shown in FIG. 7 are provided with a feeding device including a guide plate **90** for the master card which has a bracket **91** secured to a shaft **92** carrying a cam follower means **93**, **94**, **95** urged by spring **96** to a position in which a pair of cam follower rollers **94** engages the peripheral surface of carrier **72**, and during rotation also the master card **6** so that the same is tightly held against the surface of carrier **72**, permitting reliable sensing by the sensing brushes **76**, **77** and **78**.

As shown in FIG. 8 in which the carrier for the master card **6** is designated by reference numeral **21**, as in FIG. 3, an additional master card **22** is secured to the periphery of carrier **21**. As explained with reference to FIG. 7, three sensing brushes **76**, **77**, **78** are provided which are respectively mounted on sensing brush holders **28**, **60** and **50** described with reference to FIGS. 4, 5 and 6. Since the corresponding guide bodies **63** and **62** are fixed, sensing brushes **75** and **77** are not movable in axial direction of carrier **21**, whereas sensing brushes **78**, which are mounted on a movable guide body **48** as described particularly with reference to FIGS. 5 and 6, are shiftable in axial direction of carrier **21** and in longitudinal column direction of the master card **6**. The group of fixed sensing brushes **75** has twenty brushes for reading out punched holes in twenty lines of the additional master card **22** on which special information is recorded in the form of punched holes.

The fixed group of twenty brushes **77** senses the lines of the first field of master card portion **7** which, as explained with reference to FIG. 1*b* is associated with the head section of the printing form which is printed on all copy sheets. The group of twenty sensing brushes **78** can be axially shifted by the mechanism explained with reference to FIGS. 6 and 7 to be placed for reading out any selected field of master card portion **7** associated with different text sections of the printing form, or any of the corresponding fields of master card portion **8** which are also associated with text sections or lines of the printing form.

Different information recorded by punched holes in the master card may be read out during each successive revolution of carrier **21** or **72** together with the same information represented by the first field of the master card portion **7**, which represents the head section of the text of the printing form.

A control cam **128** is fixedly secured to shaft **33**, described with reference to FIG. 7, and an angularly adjustable cam **129** is also mounted on shaft **33**, but shown in FIG. 8 adjacent cam **128** for the sake of clarity. Cam **129** has adjusted angular positions **130** and **131**. Shaft **33** carries a fixed bushing on which a flange **133** with control cam **122** secured thereon is angularly adjustably mounted. A spring **134** has ends **135** and **136** secured to flange **133** and bushing **132** and urging flange **133** with cam **129** to a position in which a recess **140** is engaged by a pawl **137** which is mounted on a pivot **138** secured to bushing **132** for turning movement and is urged by spring **139** to a position engaging one of the recesses **140** in the inner rim of flange **133**. Spring **139** is secured to a pin **141** secured to bushing **132**. When an electromagnet **142** is energized, its armature moves in the direction of the arrow L, and a lever **143** is turned about pivot **144** so that a pawl **145**, which is turnable about a pivot **147**, turns flange **133** with cam **129** to the angular position **130** illustrated in broken lines, while pawl **137** engages the next notch **140** in the inner rim of flange **133** and locks cam **129** in the adjusted angular position **130**. A spring **146** connects pawl **145** with lever **143**.

When switch **148** closes, another electromagnet **149** is energized and its armature is moved in the direction of the arrow N to engage a stud **150** on arresting pawl **137** so that the same releases the respective notch **140**, permitting spring **134** to pull flange **133** with cam **129** to the initial position.

When the information punched into the master card **6** is read out, the information is transmitted to the punching device **26** so that a copy sheet already imprinted by the head section and selected text sections of the printing form, is punched in accordance with the information read out from the master card which, as explained above, is the same information which was imprinted on the copy sheet.

Shaft **33** rotates so that cams **128** and **129** rotate in the direction of the arrow O so that the start switches **151** and **152** are closed and connect the AND gates **153**, **154**, **155** to a voltage source. AND gates **153**, **154** and **155** are respectively connected with the groups of sensing brushes **75**, **77**, and **78**. Sensing brushes moving along lines of additional master cards **22** and master card **6** establish contact with the metallic body of carrier **21** when passing over punched holes. The metallic carrier **21** is connected to ground, as is the negative terminal of the voltage source.

Information recorded in the form of punched holes in additional master card **22** passes in the form of signals through the AND gate **153** to the control means of punching device **26**. At the same time, brushes **77** read out the first field of master card portion **7**, which is associated with the head section of the text of the printing form, and when brushes **77** establish contact with the carrier **21**

through punched holes, impulses pass through the AND gate **154** to the control means of the punching device **26**. Sensing brushes **77** are also connected to an AND gate **156**, but the signals produced by the sensing brushes **77** cannot pass through AND gate **156** to third control means, not shown, of punching device **26**, since a relay contact **159**, which is connected with the AND gate **156** is still open due to the fact that relay **157** is not yet energized.

At the same time, the group of sensing brushes **78** senses the second field of master card portion **7** which is associated with the first line or text section of the printing form. Where brushes **78** sense perforations in the lines of the respective field, signals pass through the AND gate **155** to the third control means of punching device **26** so that on a copy sheet which is already imprinted with the head section of the text of the printing form, and with the first text section or line of the same, is punched to represent the information of the head section and of the first text section in the form of punched holes.

It will be understood that the first, second and third control means, not shown, of punching device **26**, which are respectively connected with AND gate **153**, AND gate **154**, and AND gates **156**, **155** are always in the same position and punch the copy sheet or card in the same places, irrespective of whether the movable group of sensing brushes **78** senses the second, third, or any other field of the master card.

After information represented by the additional master card **22**, and by the head field and the first line field of master card **6** has been punched into the copy sheet or card by the punching device, start switches **151** and **152** are again opened under the control of cams **128** and **129**. If the brushes **77** and **78** pass over other punched holes in the master card during the continued rotation of carrier **21**, the signals do not pass through AND gates **154**, **155** and **156**, since the connection with the positive terminal of the voltage source is interrupted.

Shortly before carrier **21** assumes its initial position, cam member **37** on cam wheel **34** operates the linkage **40**, **42** to cause shifting of the movable guide body **48** by the action of spring **47** one step in the direction E, as described with reference to FIG. 6, so that the group of twenty brushes **78** is placed to sense lines **41** to **60** of the third field of master card portion **7** which is associated with the second text section or line of the printing form. When cams **129** and **128** again operate switches **152** and **151**, other copy sheets which were imprinted with the head section of the printing form and with the second text section or line of the same by selective operation of the counterpressure roller cooperating with the duplicating drum **10**, are punched in punching device **26** so that the punched holes represent the same information. If punching of the information of the head section is not desired, a manual switch **158** is opened to interrupt the connection established by start switch **151** between the positive terminal of the voltage source and the AND gate **154**.

In this manner information represented by the head section and by a selected text section of the printing form is punched into different copy sheets. By shifting of the group of brushes **78** in axial direction of the carrier, successsive fields of master card portion **7** associated with lines **1** to **5** are read out.

Assuming that the first field of the second master card portion **8**, as described with reference to FIG. 1*b*, is to be read out, it will be understood that this field, which is associated with the sixth line of the printing form, must be read out by the axially immovable group of sensing bushes **77** which are used for reading out the first field of master car portion **7** associated with the head section of the printing form. During the punching of this information under the control of AND gate **154**, a certain part of the copy sheet was punched in a position representing the head section. When the group of sensing brushes **77** is used for reading out the first field of master card portion **8**, the punches controlled by AND gate **154** should not be operated, but the respective information must be punched into the copy sheet by the third control means of punching device **27** which is controlled by AND gate **155** during the above described punching operation. Therefore, AND gate **154** and AND gate **155** must be closed, and AND gate **156** opened so that the third control means of punching device **26**, which punch in the region of the copy sheet associated with a selected line, are operated under the control of sensing brushes **77** sensing the lines of the first field of master card portion **8**.

After the fifth line of the printing form has been printed on a copy sheet **27**, and corresponding information was punched by the third control means into the copy sheet under the control of AND gate **156**, the group of brushes **78** is shifted axially together with the movable guide body **48** to a position closing switch **66**, as described with reference to FIG. 5. As shown in the circuit diagram of FIG. 8, the closing of switch **66** energizes relay **157** so that contacts **159**, **160**, **161** and **162** close.

Contacts **159** is connected in series with start switch **152** and connects the positive terminal of the voltage source with the AND gate **156** which is connected with the group of sensing brushes **77**. Contact **160** closes the holding circuit of relay **157** so that the same remains energized when guide body **48** moves away from limit switch **66** to carry the group of brushes **76** back to its initial position for sensing the second transversely aligned fields of master card portions **7** and **8**. Contact **161** closes the circuit of the magnetic coupling **67** which rotates spindle **64** as described with reference to FIG. 6 to move guide body **48** with the group of brushes **78** in the direction of the arrow G back to the initial position.

Contact **162** closes the circuit of electromagnet **142** which operates through lever **143** and pawl **145**, flange **133** and cam **129** so that cam **129** is angularly disposed to the position **130** in the direction of the arrow M.

When the operation is started, cam wheel **34** which carries cam member **37**, engages the cam operated switch **163**, shown in FIG. 7. The electromagnetic coupling **67** is energized and connects spindle **64** with the driven gears **69**, **68** so that the movable guide body **48**, rod **49**, and brush holder **50** with brushes **78** are moved to the initial position shown in FIGS. 6 and 8.

Cam **128** closes start switch **151**, whereas start switch **152** remains open since cam **129** was angularly displaced to the position **130**. The variable information contained in the punched holes of the additional master card **22** is sensed by the group of brushes **76**, and since start switch **151** connects AND gate **153** with the voltage source, the copy sheet is punched accordingly in the punching device **26**.

At the same time, the information of the head section is read out by the group of brushes **77** and passes through AND gate **154** to the second control means of the punching device **26** so that the copy sheet is punched with the information contained in the head section of the printing form.

At this moment, cam **128** permits opening of start switch **151**, while cam **129** has turned such an angle that its lug closes start switch **152** so that an impulse is given through the closed relay contact **159** to the AND gate **156**. Since AND gate **154** disconnects brushes **77** from the punching device due to the opening of start switch **151**, and AND gate **156** connects brushes **77** with the third control means of the punching device **26**, the information read out by the group of brushes **77**, is entered into the copy sheet in the form of punched holes. Since the group of brushes is no longer located in the first field of master card portion **7**, but now senses the first field of master card portion **8**, as shown in FIG. 1*b*,

information concerning the sixth line or text section of the printing form is now read out by the group of brushes **77** which read out information concerning the head section of the printing form during the preceding operation.

When body **48** with brush holder **50** and the group of brushes **78** arrives again in the initial position shown in FIGS. 6 and 8, limit switch **70** is opened and interrupts the holding circuit of relay **157** so that contacts **159** to **162** open. During the following revolution of carrier **21**, the second field of the master card portion **8**, which is associated with the seventh line of the printing form, is read out by the brushes **78**, while brushes **76** read out the additional master card **22**, and brushes **77** read out the first field of master card portion **7** associated with the head section of the printing form, and supply the information through the AND gate **154** to the punching device **26**. No signal passes through the AND gate **156** since contact **159** is opened.

While in the embodiment of FIGS. 8, the fields of master card **6** distributed over master card portions **7** and **8** were successively read out by one group of sensing brushes **78**, the embodiment of FIG. 9 provides a fixed group of sensing brushes **77** for each pair of transversely aligned fields of the card portions **7** and **8** of the master card **6**. The last group of brushes **77** reads out the last two fields of master card **6** which are associated with the fifth and eleventh lines, as shown in FIG. 1*b*. It is evident that in the embodiment of FIGS. 8 and 9, the master card shown in FIG. 2 can be used which has a greater number of fields in accordance with a printing form having a greater number of lines or text sections. In the embodiment of FIG. 9, additional groups of brushes **77** must be added if a longer master card is used. In the embodiment of FIG. 8, the rack bar described with reference to FIG. 6 must be longer.

The master card **6** has one to twenty lines or positions passing through two fields. Consequently a set **24** of 120 brushes is provided in the embodiment of FIG. 9. The first group **77** is connected with AND gates **154** and **156** as described with reference to FIG. 8, and the other groups of brushes are respectively connected with AND gates **155**, **155***a*, **155***b*, **155***c* and **155***d* which are connected to the third control means of punching device **26** in the same manner as AND gates **156** and **155** in the embodiment of FIG. 8. Control cams **128** and **129**, electromagnets **142**, **149** and the start switches **151** and **152** correspond to the construction of FIG. 8.

A stepping selector **113** controls the AND gates **156** to **155***d* to select the field which is to be read out.

Shaft **33**, which carries cams **128** and **129**, also carries a cam **109** whose projecting lobe operates a switch **112** after each revolution of carrier **21**. A manually operated switch **167** is connected in parallel with switch **112** to permit manual operation of stepping selector **113**.

When the machine is started, the copy sheet is imprinted between duplicating drum **10** and the counterpressure roller, while cams **128** and **129** close the start switches **151**, **152** and connect the AND gates **153**, **154** and **155** to the voltage source since start switch **152** is connected with a slide contact sliding on a contact ring whose arm **172** engages a contract Z1 connected with AND gate **155**. Since there is no connection between start switch **152** and the AND gates **155***a* to **155***d*, no signals pass through AND gates **155***a* to **155***d* to the punching device **26**.

Shortly before carrier **22** arrives in its initial position, cam **109** operates cam switch **112** to shortly close the same, so that a selector magnet **168** is energized and attracts a pivoted lever **169** carrying a pawl **170** cooperating with a stepping wheel **171** which is secured to contact arm **172**. Upon energization of selector magnet **168**, pawl **170** turns the contact arm to a position in which the stationary contact Z2 is connected with start switch **152** after contact arm **172** has turned in the direction of the arrow P the required angular distance. A spring **173** holds pawl **170** in engagement with stepping wheel **171**. Consequently, during the following revolution, the group of brushes **76**, the first group of brushes **77**, and the third group of brushes connected with AND gate **155***a* control the punching device since AND gate **155** does not permit passage of signals, and AND gate **155***a* is operative since it is connected to the voltage source through contact Z2, contact arm, **172**, and the closed start switch **152**.

When contact arm **172** moves from stationary contact Z5 to stationary contact Z6, electromagnet **142** is shortly energized through amplifier **175** and flip-flop **174** so that the shifting means **143**, **145**, **133** shift cam **129** to the position **130**, as explained with reference to FIG. 8. During the next revolution of carrier **21**, the field portion associated with the sixth line or text section of the printing form is read out by the first group of brushes **77**.

It is evident that other mechanical, electrical, optical or magnetic sensing means can be used and that the electromechanical stepping selector can be replaced by an electronic device.

FIG. 10 illustrates the printing means by which imprints are made on a copy sheet **27**. A conventional duplicating drum **10** cooperating with a counterpressure roller **120** in a printing plane **127**, moistening means **122**, transporting rollers **123** and **124**, a paper holder **125** cooperating with a guide member **126**, and a feeding table **121** for a copy sheet blank are provided in the usual manner. The printing form **2** is secured by holding means to the periphery of printing drum **10**, and since it is assumed that the master card is carried by an independent cylindrical carrier, as described with reference to FIGS. 3, 7, 8 and 9, no master card is attached to the printing form **2** as was described with reference to FIG. 4. A start lever **98** is mounted on the frame of the machine and urged by a spring **102** against a stop **104**. A pawl **100** is pivotally mounted on drum **10** and biased by a spring **108**. A locking lever **97** is urged by a spring **101** to turn about a stationary pivot to abut a stop **103**. In the initial position, pawl **100** engages start lever **98**, and lever **97** engages a stop **99** on drum **10**. A rachet wheel **106** continously rotates with shaft **32**, and when starting lever **98** is turned by operation of a pull rod **105**, pawl **100** couples drum **10** with ratchet wheel **106** so that the drum starts rotation in the direction of the arrow. After one revolution of drum **10**, pawl **100** is stopped and turned to release ratchet wheel **106** so that drum **10** stops. Locking lever **97** prevents rotation of the drum in the opposite direction, and resiliently yields during passage of pin **99** in the direction of the arrow.

Shaft **32** is connected by gears **176**, **177** and **178** with shaft **33** which carries a contact arm **179** whose end corresponds to the lobe of cam **109** described with reference to FIG. 9, and also shown in FIG. 11. In other words, the contact arm **179** is used for operating switch **112** by which the selector **113** is actuated. Shortly before drum **10** arrives in the normal initial position after one revolution, switch **112** is actuated by the cam portion of contact arm **179**, and the read out operation explained with reference to FIG. 9 starts.

Contact arm **179** has contacts cooperating with stationary contacts arranged in circles and connected with electromagnetic means controlling the angular lever **180** on which counterpressure roller **120** is mounted so that lever **180** turns about shaft **181** to move the counterpressure roller **120** to a printing position whenever a desired text section or line of the printing form passes through the printing line so that, for example, successive copy sheets are each imprinted with the head section of the printing form and with one text section or line of the same. The imprinted copy sheet is supplied to the punching device **26**, and punched in the same with the same information, as explained with reference to FIGS. 7 and 9 so that the first copy sheet has an imprint of the head sec-

tion and of the first text section, and punched holes representing the head section and the same first text section, and if desired additional information from the additional master sheet **22**, while the following copy sheets will have the second to eleventh lines or text sections imprinted, and be punched with holes representing the same information. The duplicator illustrated in FIG. 10 is of a well known conventional construction in addition to which cam operated switch **112** is provided for synchronizing the selction of text sections of the printing form and corresponding fields of the master card.

FIG. 10 also shows a switch **197** operated by the cam portion of contact arm **179** to operate an electromagnet **198**, see FIG. 12, which may be used for releasing the start lever **98**, as will be described with reference to FIG. 12.

FIG. 11 illustrates a duplicator with a duplicating drum **10** on which a printing form **2** is mounted. Locking lever **97**, and start lever **98** cooperates with the one revolution coupling **106**, **100** as described with reference to FIG. 10. When start lever **98** is turned by link **105**, pawl **100** couples the continuously rotating driven ratchet wheel **106** with the duplicating drum **10** so that the same rotates one revolution whereupon start lever **98** stops the duplicating drum **10** and releases pawl **100** from ratchet wheel **106**. Cam **109** is connected with shaft **33** through gears **164**, **165**, **166** and operates switch **112** of the selector **113** as described with reference to FIG. 9.

Cam **109** also cooperates with the cam follower **110** which is mounted for turning movement about the shaft **111** and is articulated with a lever **114** which is part of the toggle lever system **116**, **118**, **119**, **114**. Levers **116** and **118** are pivotally mounted on a support **117** whose position can be adjusted by an eccentric member in a conventional manner. Cam follower **110** turns in the direction of the arrow J so that the toggle lever system is displaced, and counterpressure roller **120** is moved in the printing plane **127** into the proximity of the periphery of duplicating drum **10** so that a copy sheet **27** is pressed against the printing form after being moistened by moistening means **122** and transported by the transporting rollers **123**, **124**.

By using a fixed cam **109** for the head section of the printing form, and other angularly displaceable and adjustable cams **109** on shaft **133** for operating the counterpressure roller when a desired line of the printing form passes the printing plane **127**, successive copy sheets are imprinted with the same head sections and different text sections or lines of the printing form. The construction of the duplicator shown in FIG. 11 is entirely conventional, but one cam **109** is used for operating switch **112** by which stepping selector is started to cause reading out of corresponding text sections by the sensing brushes, and finally punching of the copy sheet **27** with the same information which was previously imprinted.

In the embodiment of FIG. 12, the cylindrical carrier **21** carries the master card **6** on its periphery, and sensing brushes **199** are provided for sensing the fields and lines of the master card **6**. Carrier **21** is mounted for free rotation on shaft **182** and a one revolution coupling **98**, **100**, **108**, **106** operating as described with reference to FIGS. 10 and 11 is provided for stopping carrier **21** after each revolution, while the locking device **97**, **101**, **103** cooperates with pin **99** on carrier **21** to prevent turning of the carrier in a direction opposite to the direction R in which the ratchet wheel **106** rotates. Chain wheels **182**, **184** and a chain **185** are provided for driving a gear sector **186** which is mounted on a shaft **222** in synchonism with carrier **21**, chain wheel **183** being secured to carrier **21** so that gear segment **186** rotates and stops with carrier **21**.

In a certian position of gear segment **186**, the same meshes with a rack bar **200** to move the same in the direction of the arrow S against the action of a spring **215**. In an end position of rack bar **200**, latch **210** is turned by spring **219** about pivot **220** to snap behind the end of rack bar **200** to arrest the same until a pin **211** on the rotary gear segment **186** engages the release lever **212** which is pivoted on a pin **213** and causes through link **214** release of the rack bar **200** by arresting latch **210** permitting the rack bar to move to the right under the action of spring **215**.

The other end of rack bar **200** has a hook-shaped projection engaging a projection on a punch selector member which has teeth **209** cooperating with an arresting pawl **207** which is urged by spring **217** to turn about pivot **208** to a position releasing the arresting teeth of the punch selector member **202**, but is operated by an electromagnet **206** to engage a notch between two arresting teeth **209** when electromagnet **206** is energized. Electromagnet **206** is connected through an AND gate **204** and an amplifier **205** with the brushes **199** which correspond to the brushes **24** of FIG. 9. The other terminal of electromagnet **206** is connected with carrier **21** through shaft **182** so that electromagnet **206** is energized when brushes **199** sense a punched hole in the master card **6**.

Punch selector member carries a plurality of coupling rods **195** which are shiftable in bores of punch selector member **202** when the same follows the movement of rack bar **200** in the diretcion of the arrow S under the action of a spring **201**. A pair of link means **191**, **192** connects the punch plate **190** with a pair of eccentric members **193**, **194** which during rotation reciprocate the punch plate. If a coupling rod is located between punch plate **190** and one of the punches **196**, the respective punch is coupled to the punch plate **190** and pushed down into an opening in the supporting body **189** so that a copy sheet **27** located between punches **196** and support **189** is punched with holes. Transporting rollers **187**, **188** transport the already imprinted copy sheet to a punching position located under punches **196**.

Carrier **21** starts its rotation with master card **6** when start switch **197**, which may be operated by the contact arm **179** of the duplicator shown in FIG. 10, or by the cam **109** of the duplicator shown in FIG. 11, so that start magnet **198** is energized and operates start lever **98** to release carrier **21** to perform a revolution.

When master card **6** is turned into the region of the brushes **199**, which correspond to the brushes discussed with reference to FIGS. 8 and 9, gear segment **186** has been turned to an angular position in which it engages the teeth of rack bar **200** and moves the same in the direction of the arrow S, while spring **209** moves punch selector member **202** in the same direction to follow the rack bar movement.

When a brush **199** passes over a punched hole, for example hole **203** in master card **6**, the circuit of electromagnet **206** is closed, as explained above, and arresting pawl **207** engages a notch of punch selector member **202** and stops the same while rack bar **200** continues its movement in the direction of the arrow. A coupling rod **195** is located directly above one of the punches **196**, corresponding to the position of the punched hole **203** in the sensed line of the master card, and since ten punches **196** are provided in the direction of the arrow S, and each punch **196** corresponds to one of the digits from zero to nine and is related to one of the ten columns of each field of the master card **6** the punch **196** is selected which corresponds to the digit represented by hole in the column of the digit and in the line sensed by the respective brush **199**. Eccentric members **193**, **194** rotate to push down punched plate **190** which actuates the coupling rod **195** related to the respective column of the master card so that corresponding punches **196** are pushed down to an operative position for punching corresponding holes in the respective digit column of the copy sheet **27**.

The eccentric members **193**, **194** are controlled by the duplicating drum **10** to be operated during the same revolution, or during one or two revolutions later, or at any selected time.

In the meantime, rack bar **200** is moved by gear sector **186** so far in the direction of the arrow S so that latch **210** snaps behind the end of rack bar **200** and holds the same. Carrier **21** and gear segment **186** rotate farther to the initial normal position without any influence on the arrested rack bar **200** since the rack bar is passed by a smooth peripheral portion of gear segment **186**.

Since the punch selector member remains in the arrested position, any desired numbers of copy sheets **27** can be punched with the same holes while the punch selector member remains arrested by pawl **207**. In this manner, punched holes representing the head section of the printing form can be provided in a series of copy sheets.

During the following revolution of carrier **21** and gear segment **186**, the punching device **26** is cleared since stud **211** engages releasing lever **212** and releases latch **210** permitting spring **215** to pull rack bar **200** back to the initial position of FIG. 12. Since brush **199** senses no punched hole in master card **6**, electromagnet **206** has operated pawl **207** to release punch selector member **202** which is pulled by rack bar **200** back to its initial position. Spring **217** of pawl **207** is designed to pull pawl **207** against stop **218** only when punch selector member **202** is retracted in the direction opposite to the arrow S.

From the above description, it will become apparent that the printing means including duplicating drum **10** is connected by control means including shaft **33**, the cams thereon, and the circuits of FIGS. 8 and 9 to the sensing means shown to be brushes in such a manner that only the group of sensing brushes correlated with a text section printed by the printing means is operative to sense the lines of the respective field of the master card **6**. The punching device **26** constitutes a recording means, and instead of punching copy sheet **27**, which preferably is a standard card, magnetic recordings, or recordings which can be optically read out may be made on the copy sheet.

While a group of brushes **78** may be used for sensing different fields of the master card, or several groups of brushes **77** may be selectively operated to sense selected fields of the master card, the sensed information is supplied to the same punch control means including punch selector member **202** and arresting means **206**, **207** so that the copy sheet **207** is punched with the read out information at the same place, irrespective from which field of the master card the axially movable group of sensing brushes **78**, or the selective operable group of sensing brushes **77**, has read out the information.

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 printing and recording arrangements differing from the types described above.

While the invention has been illustrated and described as embodied in a method and apparatus for printing on different copy sheets different information, and for recording on each copy sheet the same information which was printed thereon, 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.

1. Apparatus for printing and recording on the same copy sheet, comprising, in combination, printing means for printing text sections of a printing form on copy sheets; carrier means for supporting at least one master card having a plurality of fields respectively correlated with said text sections, each field having crossing lines and columns of areas with recordings whose positions in said lines represent different values and whose positions in said columns represent information related to said values; at least one group of sensing means for sensing at least one of said fields, said sensing means being disposed and operable for sensing in respectively correlated lines of the respective sensed field, recordings in the areas of the respective lines; control means connecting the printing means with the sensing means and controlling said sensing means so that only fields correlated with text sections printed by said printing means are sensed; and recording means controlled by the group of sensing means to make on a copy sheet imprinted with at least one text section by said printing means, recording representing the same information as the printed text section.

2. An apparatus as claimed in claim **1** wherein said printing means is a duplicating machine for selectively printing text sections of said printing form; and wherein said control means control said sensing means so that fields correlated with selected and printed text sections are sensed and recorded.

3. An apparatus as claimed in claim **2** wherein said carrier means includes a rotary carrier cylinder, and means for attaching said master card to the periphery of said carrier cylinder; wherein said duplicating machine includes a duplicating drum supporting said printing form; wherein said control means include means connecting said duplicating drum with said carrier cylinder for rotation in such a manner that said sensing means read out said field a predetermined number of revolutions of said duplicating drum after printing of the text section correlated with the respective sensed field; and transporting means for transporting the copy sheet from said duplicating machine to said recording means so that the imprinted copy sheet receives the recordings.

4. Apparatus as claimed in claim **1** comprising a plurality of groups of sensing means respectively positioned for sensing said fields of said master card; and comprising means for successively activating said groups of sensing means so that said fields are successively sensed.

5. An apparatus as claimed in claim **1** and including means for placing said group of sensing means successively on said fields so that said fields are successively sensed.

6. An apparatus as claimed in claim **1** wherein said printing means includes a printing drum, means for holding said printing form on said printing drum, and means for successively printing text sections of said printing form; wherein said carrier means includes a carrier cylinder, and means for holding the master card on said carrier cylinder; wherein said control means include transmission means connecting said printing drum with said carrier cylinder, a rotary stepping selector, means for actuating said selector after each revolution of said printing drum, said selector including a plurality of contacts successively closed after each step of said stepping selector; comprising a plurality of groups of sensing means for sensing said plurality of fields; and circuit means including AND gates connecting said groups of sensing means and said selector contacts with said recording means, and a start switch operated after each revolution of said printing drum and connected in series with said selector contacts of said stepping selector and said AND gates.

7. An apparatus as claimed in claim **1** wherein said printing means includes a rotary printing drum, means supporting said printing form on said printing drum, and operating means for succesively printing text sections of the printing form; shifting means for shifting said group of sensing means to successive positions for sensing said fields; and means connecting said operating means with said shifting means so that during successive revolutions of said printing roller, successive text sections are printed,

and succesive fields of said master card are sensed and recorded.

8. An apparatus as claimed in claim 7 and wherein said shifting means have means for moving said group of sensing means away from said carrier means and said master card during shifting of said group of sensing means from one field to another.

9. An apparatus as claimed in claim 8 and including a fixed group of sensing means in addition to said shiftable group of sensing means and being positioned for reading out one of said fields so that the information of said one field is recorded on each copy sheet in addition to the information sensed in successive fields by the shiftable group of sensing means.

10. An apparatus as claimed in claim 1 wherein said printing means includes a printing roller for supporting said printing form; wherein said carrier means include the carrier cylinder for supporting said master sheet in a position in which said lines extend in circumferential direction; drive means for rotating said carrier cylinder; a one revolution coupling connecting said drive means with said carrier cylinder, and being actuated by said printing means after each revolution of said printing roller.

11. An apparatus as claimed in claim 1 wherein said carrier means include a carrier cylinder, and holding means for attaching said master card to the periphery of said carrier cylinder; and comprising pressure roller means for holding said master cards on said periphery of said carrier cylinder during rotation of the same.

12. An apparatus as claimed in claim 1 wherein said carrier means includes a cylinder supporting said master card and said printing form; and wherein said printing means include means for successively printing text section of said printing form on the copy sheets during rotation of said cylinder whereupon said group of sensing means senses at least one field of said master card so that recording means record the printed information on the copy sheet.

13. An apparatus as claimed in claim 12 and including means for moving said sensing means away from said cylinder during passage of said printing form under said group of sensing means.

14. An apparatus as claimed in claim 1 wherein said carrier means includes a rotary carrier cylinder for supporting said master card on the periphery thereof; and comprising operating means for moving said group of sensing means between a sensing position in the proximity of the periphery of said cylinder, and an inoperative position farther spaced from the same, said operating means holding said group of sensing means in said sensing position only during passage of said master card under said sensing means.

15. An apparatus as claimed in claim 1 wherein said carrier means includes a carrier cylinder for supporting said master card; wherein said sensing means are electric sensing means; and comprising a circuit having a rotary contact and being connected with said electric sensing means so that said sensing means are operable only while said master card passes under said sensing means.

16. An apparatus as claimed in claim 15 wherein said circuit means includes a rotary stepping selector having a rotary contact arm and a plurality of selector contacts respectively correlated with said fields, a start switch connected with said selector contact arm; and adjustable means including a rotary member connected with said carrier cylinder for rotation and operating said start switch so that by adjustment of said adjustable means said sensing means are rendered operable when different portions of said carrier cylinder and of said master card pass under the sensing means.

17. An apparatus as claimed in claim 16 comprising a plurality of groups of sensing means for sensing different fields, and respectively connected with said selector contacts of said stepping selector means.

18. An apparatus as claimed in claim 17 and including a plurality of AND gates respectively connected with said groups of sensing means and with said selector contacts, said AND gates being connected with said recording means.

19. An apparatus as claimed in claim 1 wherein said carrier means includes a carrier cylinder having a circular peripheral portion, and a recessed peripheral portion, and means supporting said master card on said circular peripheral portion so that said group of sensing means is spaced from said carrier cylinder when said recessed peripheral portion of the same passes said group of sensing means.

20. An apparatus as claimed in claim 1 wherein said master card has two card portions each having a plurality of fields, pairs of fields of said card portions being transversely aligned so that the lines of the fields of said pairs are transversely aligned; comprising a fixed group of sensing means, and a shiftable group of sensing means shiftable between a plurality of positions for sensing different pairs of fields, said fixed group of sensing means being correlated with the head section of the printing form; wherein said recording means include first and second recording means respectively connected with said groups of sensing means; and circuit means connected with said groups of sensing means and including relay means having relay contacts in said circuit means, AND gates for connecting said group of sensing means with said first and second recording means and controlled by said relay contacts so that said fixed group of sensing means is connected with said first recording means when sensing the field of one card portion associated with the head section of the printing form, and is connected with said second recording means when sensing a field transversely aligned with said first mentioned field and correlated with a text section of said printing form, and switch means for energizing said relay means when said movable group of sensing means arrives in an end position.

21. A method for printing and recording the same information on a copy sheet, comprising making a printing form having text sections; making simultaneously with the making of said printing form sections, recordings on a record carrier having a plurality of fields respectively correlated with said text sections, each field having crossing lines and columns of recording areas so that different positions of recordings in said lines represent different values, and different positions of said recordings in said columns represent different information regarding said values; printing text sections of said printing form on copy sheets; sensing on said record carrier recordings in the areas of the lines of each field correlated with a printed text section; and recording on the copy sheets the sensed information so that any one copy sheet has the same information printed and recorded thereon.

22. The method of claim 21 wherein the recordings in the lines of each field are sensed by the same sensing means; and wherein the information sensed by said sensing means in different fields is recorded in the same portion of different copy sheets.

23. The method of claim 21 wherein different fields are sensed by different sensing means; and wherein the information sensed by said different sensing means in different fields is recorded in the same portion of different copy sheets.

24. The method of claim 21 wherein said record carrier is a master card having said plurality of fields adjacent each other.

25. The method of claim 24 wherein said recordings are made successively on two master card portions; and including attaching adjacent longitudinal edges of said master card portions to each other so that pairs of fields of said master card portions are aligned in transverse direction of said matser card, and so that the lines of each pair of fields are aligned in transverse direction.

26. The method of claim 25 wherein said master card portions initially are integral and have aligned longitudi-

nally extending columns; wherein said master card portions are folded in accordion pleats; including cutting said master card portions apart in transverse line direction; and attaching longitudinal edges of said master card portions to each other so that pairs of said field are transversely aligned, and so that the lines of each pair of fields are aligned.

27. The method of claim **21** wherein said record carrier has a first field correlated with a head section of the printing form; and including sensing said first field, and recording the information sensed in said first field in corresponding portions of different copy sheets.

28. The method of claim **21** wherein said record carrier is a master card having first and second card portions with first and second fields, one end field of said first card portion being correlated with a head section of the printing form, and all other fields being correlated with text sections of the printing form; wherein information sensed in said end field of said first fields is recorded in the same place of different copy sheets; wherein after said end field, first said first fields correlated with text sections, and then said second fields correlated with text sections are sensed by said sensing means.

29. The method of claim **21** wherein said text sections of said printing form, and said recordings in said fields of said record carrier are automatically made.

30. The method of claim **21** including attaching said record carrier to said printing form; and moving said printing form with said attached record carrier so that first said text sections are printed on a copy sheet whereupon recordings are made on the same copy sheet under the control of the recordings on said record carrier.

31. The method of claim **21** wherein said record carrier is a master card, including mounting said master card on a rotary carrier; and repeatedly sensing said master card during successive rotation of said rotary carrier.

32. The method of claim **31** wherein said sensing is carried out in timed relation with said recording on the copy sheets.

33. The method of claim **32** including attaching an additional master card to said carrier, sensing recordings on said additional mastercard, and recording the additional read out information on said copy sheets.

34. The method of claim **21** wherein said sensing is carried out in timed relation and after said printing of said text sections; and said recording is carried out in synchronism with said sensing so that said copy sheets are imprinted with text sections when the sensed information is recorded thereon.

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