June 4, 1935. M. MAUL 2,003,636

PRINTING AND PUNCHING RECORD CONTROLLED MACHINE

Filed June 11, 1931 4 Sheets-Sheet 1

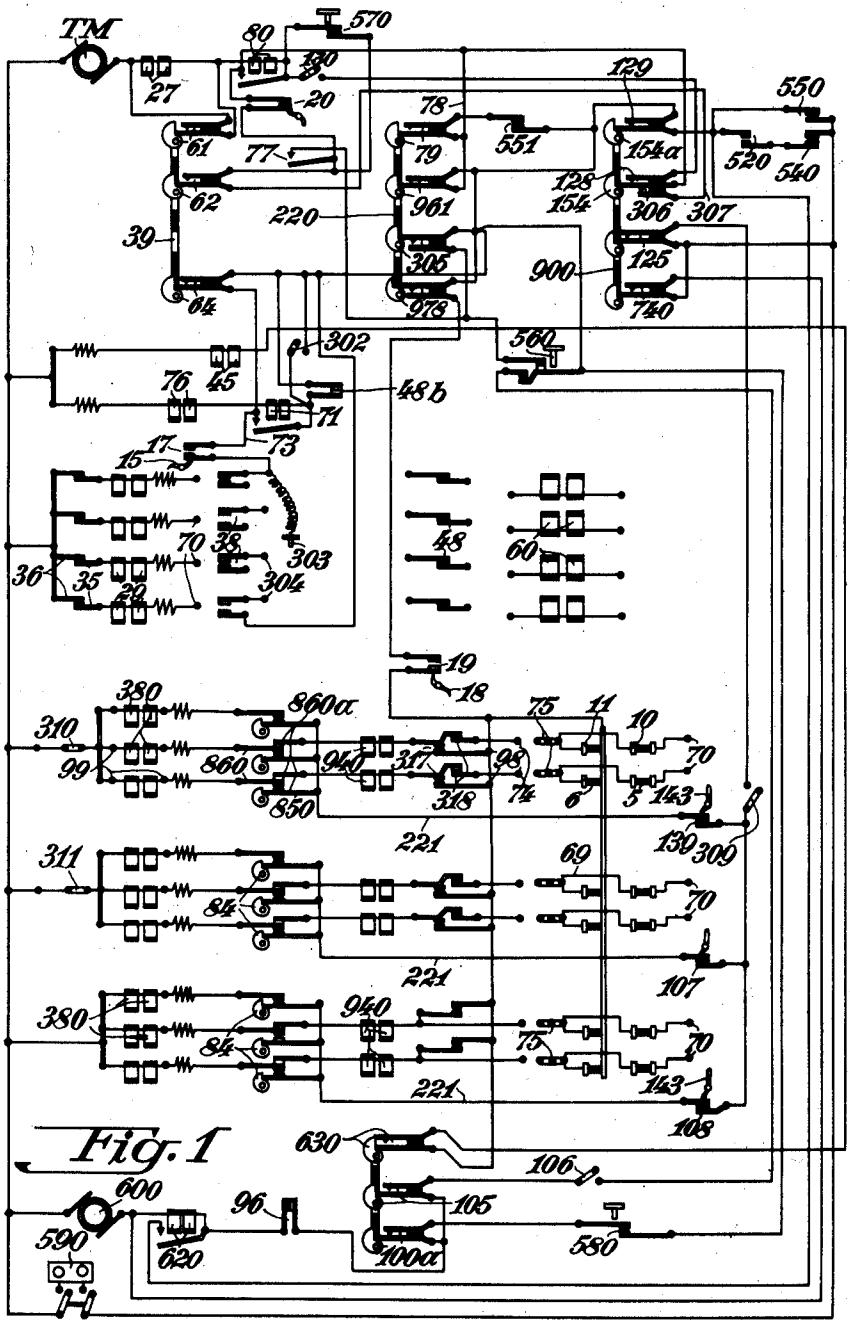


Fig. 1

Inventor:
Michael Maul

June 4, 1935. M. MAUL 2,003,636

PRINTING AND PUNCHING RECORD CONTROLLED MACHINE

Filed June 11, 1931 4 Sheets-Sheet 2

Fig. 2

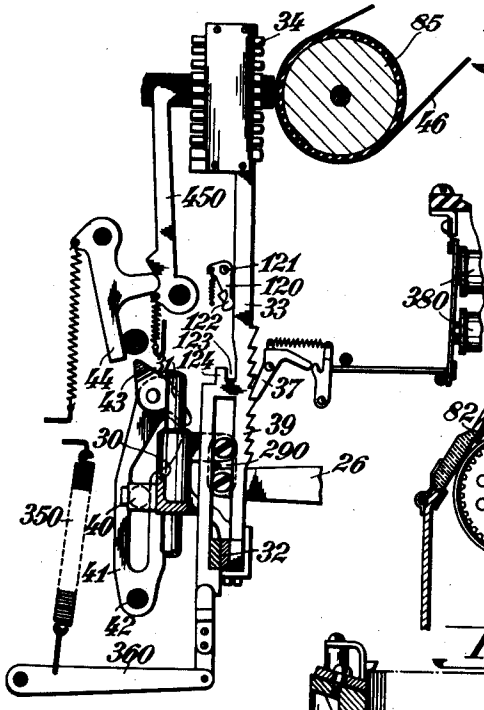


Fig. 3

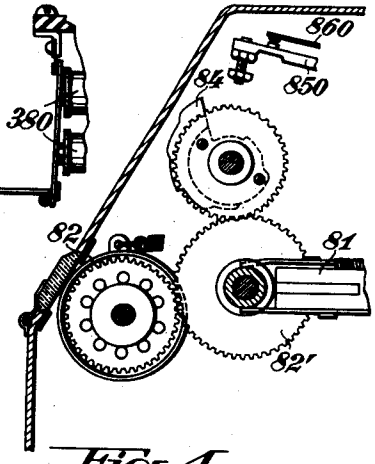
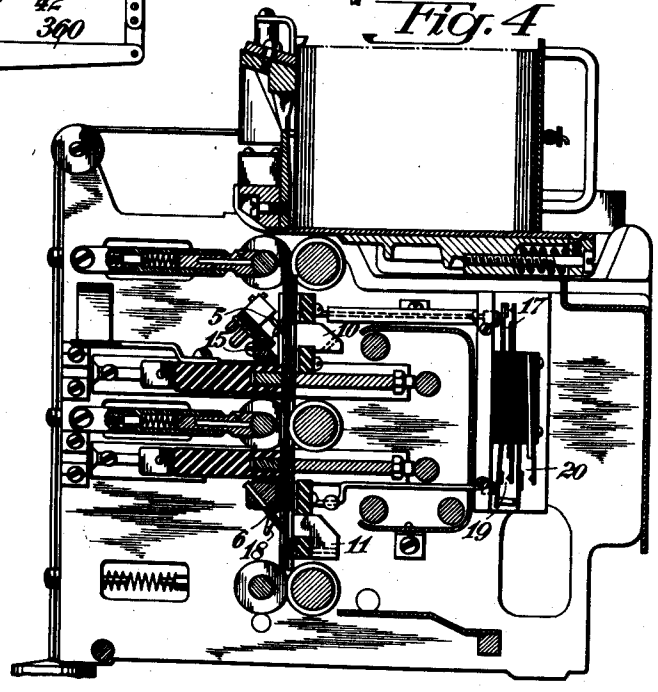


Fig. 4



Inventor:

Michael Maul

June 4, 1935. M. MAUL 2,003,636

PRINTING AND PUNCHING RECORD CONTROLLED MACHINE

Filed June 11, 1931 4 Sheets-Sheet 3

Fig. 5

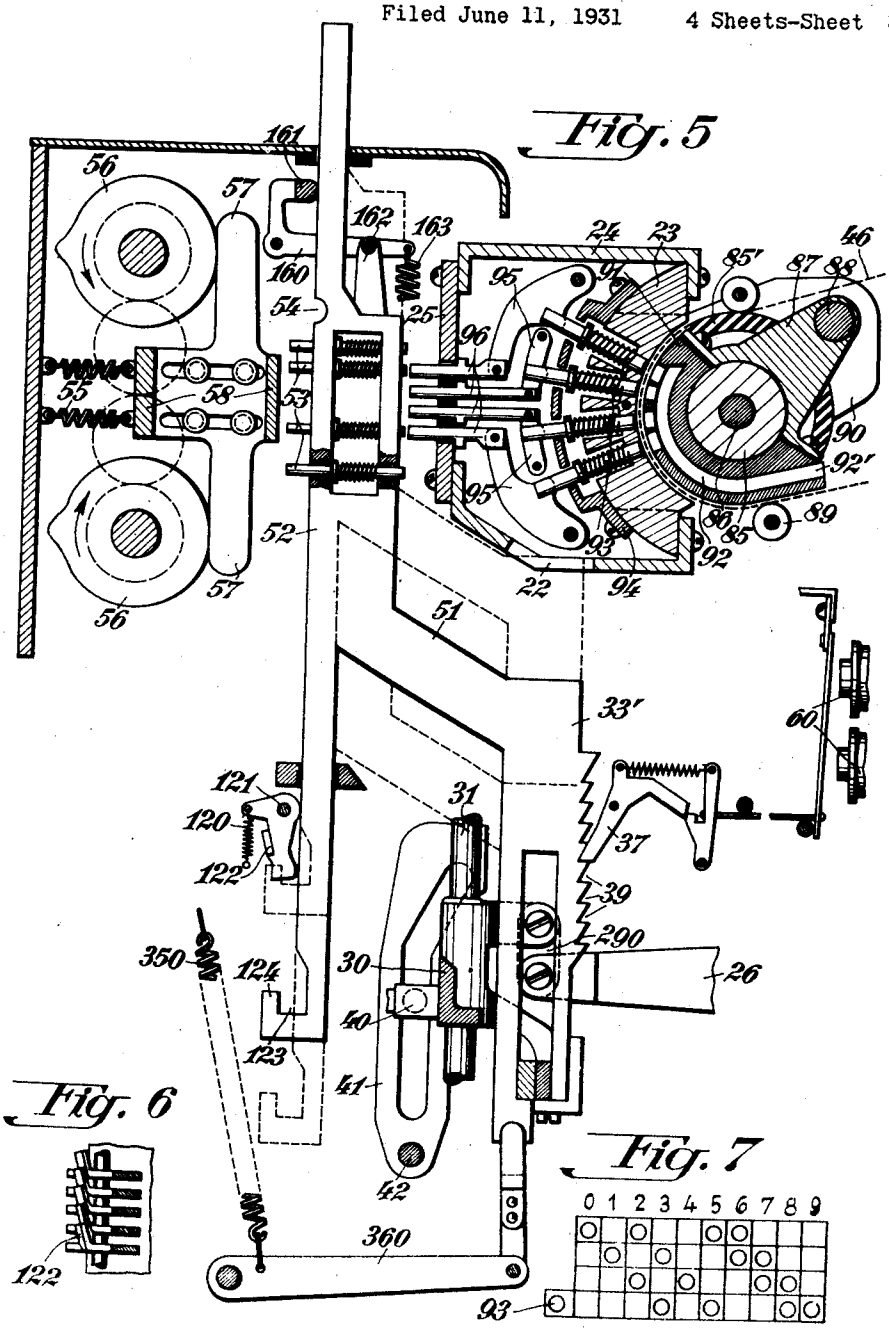


Fig. 6

Fig. 7

Inventor:
Michael Maul

June 4, 1935. M. MAUL 2,003,636

PRINTING AND PUNCHING RECORD CONTROLLED MACHINE

Filed June 11, 1931 4 Sheets-Sheet 4

Fig. 8

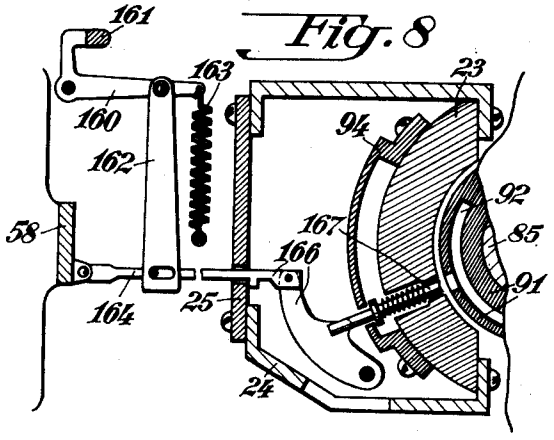
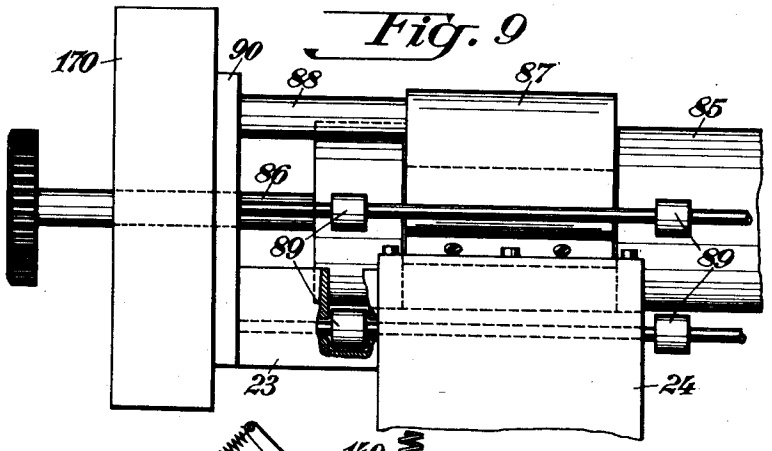


Fig. 9



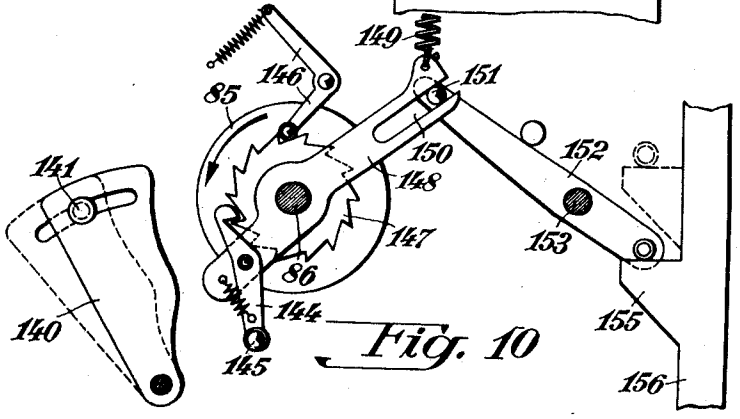


Fig. 10

Inventor:
Michael Maul

Patented June 4, 1935 2,003,636

UNITED STATES PATENT OFFICE

2,003,636

PRINTING AND PUNCHING RECORD CONTROLLED MACHINE

Michael Maul, Berlin-Johannisthal, Germany

Application June 11, 1931, Serial No. 543,599
In Germany June 14, 1930

30 Claims. (Cl. 101—19)

The present invention relates to punching and printing mechanisms and more particularly to perforated record card controlled punching and printing machines. Though the machine according to the invention may also be used in connection with accumulating means or without a printing mechanism the present case relates only to punching and printing whereas other features of the invention are claimed in my co-pending divisional applications Serial No. 649,000 filed December 27th, 1932 and Serial No. 683,364 filed August 2nd, 1933.

It is the main object of the present invention to provide a punching and printing mechanism both being under the control of common controlling means, and more particularly under the control of perforated record cards.

A further object of the invention is to provide an automatic perforated record card controlled machine having punching and printing means both being under the common control of said record cards and being controlled upon the passage of each record card in accordance with the perforations in said cards.

A further object of the invention is to automatically feed a continuous record sheet past said printing and punching mechanism and to punch and print upon the sheet in accordance with the perforations in the record cards passing through the machine.

Another very important object of the invention is to provide in automatic record card controlled machines punching and printing means which are both under the common control of said record cards, and a group control mechanism adapted to modify the operation of the machine upon a change in the perforations controlling commonly said punching and printing means.

Another object is to provide a machine of the type indicated with a group control mechanism wherein upon each card passage printing and punching are effected.

A further object is to provide a machine of the type indicated with a group control mechanism wherein punching is interrupted after the passage of the first card of each group while printing will be effected upon each card passage.

A further object is to provide a machine of the type indicated with a group control mechanism wherein printing is interrupted after the passage of the first card of each group while punching will be effected upon each card passage.

A further object is to provide a machine of the type indicated with a group control mechanism wherein punching and printing are interrupted after the passage of the first card of each group.

Another object of the invention is to provide an automatic perforated record card controlled machine of the type indicated wherein punching and or printing is interrupted under the control of the group control mechanism after the passage of the first card of each group and wherein only a part of said printing means are under the control of record columns which also control said punching means.

A further important object of the invention is to make provision in a machine embodying the above indicated features that punching and printing are effected upon a continuous record sheet being automatically fed past said printing and punching mechanisms.

Another essential object of the invention is to provide a machine of the type indicated wherein the punching mechanism is adapted to produce hole combinational characters while the joint control of said punching mechanism and the printing mechanism is effected by record cards according to the single hole system.

Still another object of the invention is to provide in a perforated record card controlled machine a separate set of punching means and a separate set of printing means which are both under the control of a common set of analyzing means for said record cards.

A further important object of the invention is to provide in a printing and punching perforated record card controlled machine a rotatable feeding roller platen feeding a continuous record sheet simultaneously past said printing and punching mechanisms, wherein a matrix plate is stationarily mounted in a recessed groove of said platen while the punching stamps are arranged opposite said matrix.

Another object of the invention is to make provisions to cause said punching stamps to produce combinational hole characters.

A further object is to provide in a machine of the type indicated having a matrix in the groove of a feeding roller, and common record card controlled controlling means.

Still a further object of the invention is to provide in a machine of the type indicated having a matrix in the groove of a feeding roller, selecting means for the punching means as well as selecting means for the printing means, both sorts of selecting means being adjustable in equal steps and the adjusting steps of both sorts of selecting means being also equal.

Still another object of the invention is to provide a separate set of punching means and a

separate set of printing means both sets being actuated by common driving means and being under the control of common record card controlled means.

Further objects and advantages of the invention will be seen from the following specification and the claims and the accompanying drawings which illustrate a preferred embodiment of the invention.

The machine according to the invention may be advantageously employed for various purposes, however, it is particularly adapted for carrying out a novel method of preparing statements and the like, as described in my copending patent application Ser. No. 550,939, filed July 15th, 1931.

Fig. 1 shows the diagram of an electrical tabulating machine to which the perforating mechanism according to the present invention may be applied.

Fig. 2 illustrates the known printing device of a tabulating machine for one record column.

Fig. 3 shows the known arrangement of an accumulator wheel being under the control of the perforated record cards and turning simultaneously therewith a total number wheel.

Fig. 4 is a section through the card analyzing mechanism of the machine.

Fig. 5 represents in an enlarged scale (as compared to Figs. 2–4) a section through the perforating mechanism according to the present invention and shows the control for the perforation in a single record column.

Fig. 6 shows the device for the automatic zero printing and zero perforation.

Fig. 7 shows the perforating system according to which the different numerals are represented by different hole combinations.

Fig. 8 is a section through the perforating mechanism at the extreme left perforating place in which the standard point hole for the numerical hole combinations is produced.

Fig. 9 is a top view of the left side of the platen roller and of the perforating mechanism of the tabulating machine.

Fig. 10 shows the record sheet feeding mechanism of the machine, said mechanism being adjustable to feed steps of different length.

The illustrated embodiment shows in addition to the perforating mechanism more or less diagrammatically the essential parts of a known electrical tabulating machine in which the cards are fed through the machine one by one and are analyzed by analyzing brushes which in turn control the printing and accumulating mechanisms of the machine in accordance with the perforations of the cards. The accumulator is electromagnetically engaged in a known way and mechanically rotated, and the printing mechanism is recoprocating either horizontally or vertically and is provided with a number of type bars corresponding to the number of columns of the record card, said bars being upon item printing under the control of the cards or upon total printing under the control of the accumulator mechanism. Since the mechanical parts of such a machine are generally known and since such a machine is described in several patents (such as for instance in the United States Patent No. 1,600,413 and Reissue-Patent No. 16,304), the present specification will refer only to the most essential parts and the general operation of the machine will be described in connection with the circuit diagram.

The accumulator mechanism is shown diagrammatically in Fig. 3 in which the accumulator wheel is indicated at **82**; said wheel is driven by a wheel **82'** which may be engaged by means of a coupling linkage **81** with the continuously rotating drive shaft. The clutch linkage **81** is electromagnetically controlled by the accumulator magnet **940** (Fig. 1) of the respective record column, and will be disengaged at the end of the card passage so that the amount corresponding to the perforation will have been entered into the accumulator wheel **82**. Simultaneously with the accumulator wheel **82** the cam wheel **84** is rotated by the drive wheel **82'**, the height of the steps of said cam wheel corresponding to the adjustment of the accumulator wheel **82**. The cam wheel **84** is analyzed by means of contact devices **850, 860** (Fig. 3) which in turn control the printing magnets **380** (Fig. 1) in accordance with the adjustment of the accumulator so that the respective total will be printed.

The printing mechanism may be under the control of the record cards for item printing as well as under the control of the aforesaid contact mechanism **850, 860** for total printing. The printing mechanism for one place (corresponding to one record column) is shown in Fig. 2. From this figure it may be seen that the ends of a reciprocating lever **26** are connected by links **290** with a cross head **30** being movable along vertical bars **31** and receiving a vertical movement by the aforesaid lever **26**. From the cross head **30** extend arms carrying a cross beam **32** passing through a number of slotted type bars **33**; each type bar **33** carries on its head the type **34** being movable in vertical direction and corresponding to the ten numerals 0–9. The bars **33** are normally drawn upwardly by spiral springs **350** which are connected to levers **360**; consequently the bars **33** are held in engagement with the cross beam **32** and will follow the upward movement of the latter (which the same receives by lever **26**) until they are arrested by the pawls **37** which are under the control of magnets **380**, said pawls engaging in to the notches **39** of the bars **33**. The spacing of the notches **39** corresponds to the spacing of the movable type **34** and the movement of the bars **33** under the influence of lever **26** is effected in synchronism with the passage of the record card under the analyzing brushes; if therefore the brush encounters a hole the coordinated magnet **380** will be energized and thereby the bar **33** will be arrested on a point of its upward movement at which the type corresponding to the perforation is in printing position and the bar will be held there until printing has been effected.

The cross head **30** has rearwardly extending projections with rollers **40** engaging into the slots of levers **41** which are pivotally mounted at **42**; if the cross head rises said levers will be pressed rearwardly consequently to the slots and the cross beam **43** will therefore be moved to the left in engagement with the pivotally mounted spring actuated levers **44**; the latter will be pressed rearwardly thus moving a number of spring actuated printing hammers **450** away from the type. At the end of the upward movement of the cross head **30**, however, the bar **43** will be drawn downwardly and escapes from the ends of the levers **44**; since the same are then all simultaneously released they will be drawn by their springs in clockwise direction so that the printing hammers will impel the selected type or an idle type of the type bar against the platen **85**. Consequently, the type will print upon the record sheet **46** the numeral corresponding to the perforation.

For the suppression of zero printing in the places to the left of the highest numeral place and for automatic zero printing in the places to the right therefrom, there is a zero controlling mechanism provided which is shown more in detail in Figs. 2 and 6. This controlling mechanism comprises a lever 120 for each type carrier, said levers being pivotally mounted at 121. Each lever has an arm 122 extending over the lever to the left thereof. If the lower ends of the levers 120 catch into a notch 123 of the bars 33 the bars are permitted to move upwardly to a point where an idle type is in printing position; however, if the levers 120 do not engage into said slots the type bars are arrested by a projection 124 in a position being for one unit lower and in this position the type carriers will hold the zero type in printing position so that in all the respective places zeros will be printed. It will be seen that consequently to the superposition of the levers 120 in all places being to the right of the highest numeral place automatically zeros will be printed, in item as well as upon total printing (independently of the control of the type bars by the record cards or by the accumulator) in case there is no other numeral adjusted, and that in places being to the left of the highest numeral place the type bars will be moved to the highest position since in said places the arms 122 are permitted to move freely into the slots 123 so that in said places no printing will be effected at all.

Since the perforating mechanism may be used at will in connection with the printing tabulating machine, at first the operation of the tabulating machine without perforating mechanism shall be described on the circuit diagram and thereafter the perforating mechanism will be described as well as the insertion of its control magnets into the current circuits of the tabulating machine.

By depression of the start key at 570 (Fig. 1) the current circuit will be closed from the main line through the tabulator motor TM, and leading then over the clutch magnet 27, motor relay 80, start contacts 570, motor control relay contacts 77, cam contact 305 (now being closed), cam contact 129 and contacts 550 to the other side of the current source. If only item printing is to be effected the same current circuit as has been mentioned before will be closed with the only exception that the current will then flow from the cam contacts 129 through the contacts 520 and 540 to the other side of the main line, and the machine is operated at a lower speed. It is to be mentioned that the cam contacts 61, 62, 64 are all controlled in unison by means of shaft 39 which rotates synchronously with the other parts of the machine. The cam contacts 305 are controlled by shaft 220 rotating synchronously with the shaft 39. The cam 154*a* for contact 129 is fast upon shaft 900 of the printing mechanism. Consequently, if only the accumulator mechanism is in operation and no item printing is effected, this shaft will be in rest position. It will only be operated upon total printing and resetting of the accumulators. The automatic group control mechanism comprises in the illustrated embodiment four group indicator contacts 48 and a contact 48*b*; another contact serves to control the control relay 71 and contact 48 serves to complete the current circuit if the accumulator is only to be used for group indicating without any automatic group control. The first of the last mentioned contacts energizes relay 71 if all contacts are closed, the relay remaining then closed under the influence of a cam controlled contact 64 as will still be described.

Card feeding is initiated either automatically or manually by the start key 570 and the cards run one by one through the machine as soon as the clutch magnet 27 connects the card feeding mechanism with the drive of the machine. If the cards start to run one by one through the machine, nothing will happen until the first card comes under the lower brushes 6 and closes by means of card lever 18 (see Fig. 4) the contacts 19 and 20 after the contacts 17 have been closed before by the other card lever 15. If it is now assumed that only cards belonging all to the same group are running through the machine the controlling holes under the upper and lower brushes will pass at the same time under said brushes. This will establish a current circuit from a lower brush 6 to the contact block 11 and then through line 69 to the contact block 10 of the corresponding upper brush and from there to brush 5. The current circuit leads from the upper brush to the plug contact 70 of the plug board; for reasons of clarity the plug connections which are normally to be made are not shown in the diagram. The current may then flow through one of the control magnets 29 back to the current source; the energized control magnet interrupts the contacts 35, 36 to take the spark from the brushes and simultaneously the contacts 38 will be closed which complete a part of the shunt circuit including the control relay 71. The same operations will take place during the passage of the remaining record columns at the brushes being inserted into the group controlling circuit so that the shunt circuit will be completed. During the machine cycle the cam contacts 64 are instantaneously opened which has, however, no effect upon the relay 71 since the current circuit 73 is still closed by contacts 38 while in the other case the current circuit of the relay would be interrupted. The plug 303 may be inserted into any one of the contacts 304 in order to exclude one or a plurality of control circuits if less than the total number of the existing group control units are required.

At the end of the passage of the first card under the lower brushes the cam controlled contacts 630 will be closed thereby causing a current impulse through the group indicator magnet 45 which releases a lever not shown in the drawings and permits a bar to open all contacts 48 as long as the card run through the machine is not interrupted so that said contacts will remain open. It is still to be mentioned that the group indicator contacts 48 are inserted between the points 74 and 75 to prevent entering of group data of the following cards into the accumulator after the group number has once been entered into the accumulator from the first card.

From the foregoing it will be seen that the group controlling circuit remains closed as long as subsequent cards are in agreement and consequently the machine will continue in its operations. If it is now assumed that the last card of a group has passed under the upper brushes and is about to come under the lower brushes, the first card of the following group will be under the upper brushes; since both cards are provided with different group numbers the aforesaid controlling circuit will be interrupted between the upper brushes 5 and block 10 thereby interrupting also the current circuit 69 and preventing energization of magnets 29. Consequently, the contact 38 and the current circuit 73 will remain

open so that upon opening of contacts 64 the relay 71 will be deenergized and will interrupt the current circuit of motor relay 76, thereby opening the contacts 77. These contacts are in shunt to the circuit 78 and are inserted in mere tabulating operations (only accumulating and total printing) over cam contacts 961 and upon total printing over cam contacts 79; said contacts open at the end of the machine cycle and consequently the motor relay 80 and also clutch magnet 27 will be deenergized so that the machine will be stopped.

If total taking is to be effected manually, the switch 106 (as shown in the drawings) must be opened and the reset key 580 must be depressed. Then a current will flow from the current source 590 through contacts 550 (in tabulating operations) or contacts 540, 520 (upon item printing), then through contacts 129 now being closed, through the various lines to the reset key 580, the contacts 100a now closing, the clutch magnet controlled contacts 96, reset magnet 620, reset motor 600 to the other side of the main line and back to the current source. The cam contacts 100a, 105 and 630 are provided upon a shaft rotating synchronously with the shafts 39 and 220. The reset motor 600 causes printing of the total and resetting of the selected accumulators as is usual in tabulating machines. After total taking and resetting has been initiated by the reset key 580, the current is taken over from the reset motor by a relay controlled magnet 620 short circuiting the reset key 580. After total taking and resetting the magnet 620 will be short circuited. The control of the printing and resetting motor is governed by contacts 740 being provided upon shaft 900 rotating once during the printing and resetting cycle. Said contacts open at the end of the printing and resetting cycle the current circuit to the motor 600 and prevent thereby further rotation of the same. The means to take at first the total and then reset the accumulators are controlled by magnet 620 as is explained in prior patents. It is still to be mentioned that the contacts 96 prevent printing and resetting if the tabulating motor TM is running and has energized the clutch magnet which opens the contacts 96.

If the total is to be taken automatically the switch 106 must be closed. Then the contacts 105 which initiate printing and resetting will be closed (just before the machine is stopped automatically under the control of the group controlling mechanism) and printing and resetting will then be effected in the above described way. The current circuit of the switch 106 extends over the contacts which are under the control of stop key 560; if therefore said contacts are open total taking cannot be automatically initiated.

After a total has been taken either automatically or by key actuation, restarting of the machine for the next card group may be effected either automatically or manually. For the manual release only the start key 570 must be depressed thereby initiating another machine cycle as has been described. In order to effect an automatic restart of the machine the total switch 130 must have been closed before. Over said switch will another start circuit be closed as follows: From the current source 590 through tabulating motor TM, clutch magnet 27, motor relay 80, switch 130, cam contacts 126 being closed at the end of the printing and resetting cycle by the cam 154, around motor relay 80, through the lower card lever contact 20 (now being closed since there are cards in the machine), through motor relay controlled contacts 77 (now being closed) then either through cam contact 305 or interruptor contacts to the cam contacts 129 (now being closed), through one of the contacts 550 or 520/540 to the other side of the line and back to the current source. Said current circuit will automatically initiate another machine cycle. The machine will then continue in its operations since the contacts of motor relay 80 remain closed until they are opened again at the end of the next card group under the influence of the automatic group control mechanism, whereupon total taking, resetting and restarting of the machine may again be initiated in any one of the above described manners.

If the card supply is exhausted, accumulation of the data of the last card will be completed in the known way and then total taking will be effected; this, however, needs no further explanation in connection with the present invention since the respective operations are described in the above mentioned prior patents. The cam contacts 630 serve to release the current impulse to the group indicator magnets 45 at the proper moment in the machine cycle. The cam contacts 125 serve for the control of the current supply to the current circuits 221 leading to the total taking contacts 850 and 860 which are controlled in the known way by the cam disks 84; the printing magnets 380 are in series with the contacts 860.

To control printing of the total from any of the accumulators at will, there are provided three contacts 108, 107 and 139 which are controlled by levers 143. If said contacts are open the printing current circuits of the coordinated accumulators will be interrupted thereby preventing total taking. If it is desirable to switch off simultaneously all total taking magnets the switch 309 can be opened thereby interrupting the current circuit of the cam contacts 125. In the present embodiment the printing magnets are permanently in series with the accumulator magnets 940 and if a controlling impulse is released both magnets will be energized simultaneously. The adjustment of the machine either for item printing and accumulation or accumulation only may be controlled by a special lever which controls also the drive mechanism of the machine. This mechanism as well as further details are, however, clearly described in the prior patents so that no further explanation is necessary in the present specification.

The switch 302 shown in the diagram serves to close a current circuit which prevents in any way automatic group control; this is desired if the machine shall only accumulate the data or if only item printing shall be effected independently of the group designations of the cards.

The switches 310 and 311 serve to permit tabulation if they are closed; if the switch 302 is closed the automatic group control mechanism is switched off. If the switch 302 is open as illustrated and switch 310 is closed, group control will be effected in the record columns coordinated to the accumulator as far as corresponding switch connections have been made.

In a printing tabulating machine the accumulator wheels control total taking while item printing is effected by record cards. The accumulator magnets 940 which are energized by the holes and which are adapted to engage the accumulator wheels close a shunt circuit about the brushes over the contacts 317. This is for a

double purpose, on the one hand to take the spark from the lower brush 6, and on the other hand to maintain the current circuit through the accumulator magnet 940 and the printing magnet 380. If now the automatic group control is used the same devices are used. By energization of the magnets 940 the main current circuit of the brushes will be interrupted by contacts 318, and simultaneously the shunt circuit will be established through contacts 317. Consequently to the interruption of the contacts 318 back circuits through the holes of the upper card are prevented.

To the contacts 108, 107 and 139 for the selective control of total printing from the various accumulators are bell crank levers 143 coordinated; said levers are under the control of the reset clutches as has been described in the above mentioned prior patents. If the reset clutch of any accumulator is moved to the left, resetting of the corresponding accumulator will be prevented by simultaneously opening the coordinated contact 108, 107 or 139, and accordingly also total taking from the respective accumulator which is not reset will be prevented. If on the other hand the clutch member is adjusted in the right hand position, the accumulator will be reset and the corresponding switch will be closed so that also a total will be taken from said accumulator. In the generally known way provision may also be made to take a total without resetting the accumulator.

Now, reference will still be had to a few general operations of the machine: If the machine is to be used only for mere accumulating (without printing any items) the tabulator will operate in the usual way with a higher speed, and by means of the shiftable speed mechanism the contacts 520/540 will be opened. At the same time, the operator of the machine will open the switch 309 which prevents total printing. The machine may then operate as ordinary computing machine and the printing mechanism will be idle during the accumulation. Upon resetting, the printing mechanism will perform one cycle, but since the total taking circuits are not closed no printing will be effected.

If it is desirable to accumulate the data of each card group and to print the total of each group, the switch 309 must be closed so that total printing at the end of each card group will be permitted. During such accumulating operations, item printing will be entirely suppressed and during the printing operations only the total of the previously accumulated items and the coordinated group number will be printed.

The above described manner of operation may be performed either full- or semi-automatically. So for instance the data of a stack of cards may be accumulated and if the switch 302 for the automatic group control is open the accumulation will be automatically interrupted if the card group changes. Total taking may then be initiated manually by depressing the key 580 or automatically (if the switch 106 has been previously closed.) After total taking (either automatically or manually) the tabulating machine may be restarted either automatically or manually. In the latter case it is only necessary to depress the start key 570 while in order to cause automatic restart the switch 130 must have been closed. If said switch is in closed position the initiation of another machine cycle will be automatically effected by the cam contact devices.

If it is desirable to print items, the printing mechanism is rendered operative through the printing lever as has been described in the prior patents. Simultaneously therewith the speed control mechanisms will be shifted so that the corresponding contacts will be opened and this will cause operation of the tabulator with a lower speed. It is then possible to print the various items and to accumulate the same as well as to print the respective totals. It will be seen that the group numbers serve for the control of the operation of the machine and also for the control of total taking and that in the described embodiment they are not entered into the accumulator from each card; the group number is printed adjacent the first item and then no further printing will take place until the total is taken when the group number will again be printed adjacent the total. The group number may, however, also be printed to each individual item, but then the group indicator contacts 48 are not inserted into the analyzing circuit; with this manner of operation the group number will not be printed together with the total.

The perforating mechanism which is provided according to the present invention in the tabulating machine, comprises a number of perforation units, one unit being provided for each record column to be punched as is for instance shown in Fig. 5. From Figs. 5 and 9 may be seen that at the one end (preferably at the left end) of the printing roller 85 there is a groove provided in said roller in which a matrix block 91 is located; the latter is rigidly connected to a holder 87 in such a way that the inner stump of the platen is permitted to revolve freely in the boring between 91 and 87. The holder 87 is rigidly connected by a bar 88 with a plate 90 being connected to the bearing 170 of the platen; to the plate 90 is fastened also the punch carrier 23. It will be seen that the record sheet 46 is free to move between the punch carrier 23 and the matrix block 91. Through the punch carrier 23 passes a guide bar of the guide rollers 89 for the record sheet and similar guide rollers are provided above and below the platen at both sides of the punching mechanism so that the record sheet is fed safely by the rotating platen between the fixed matrix block 91 and the punch carrier. The matrix block 91 has a hollow space 92 extending axially to the platen over all rows of punching stamps and terminating into a pipe 92' being preferably connected to an exhaust line operated by a ventilator or the like in order to remove the waste from the space 92. The punch carrier 23 comprises for each record column four resiliently mounted punching stamps 93 being symmetrically arranged above and below the printing line and being normally held by a cover plate 94 in the position shown in the drawings. The punching stamps 93 are slotted at their outer ends and into said slots engage pivotally mounted levers 95 being connected with slides 96 which extend through the guide plate 25 of the punching stamp case 24 to the outside of said plate. The distance of the slides 96 from each other corresponds exactly to the distance of the notches 39 of the punching stamp carrier bar 33', 51, 52 and the notches 39 in turn correspond exactly to the similar notches of the type bar shown in Fig. 2. For the representation of a certain numeral the punching stamps 93 are depressed by means of the slides 96 either singly or in different combinations in order to punch a hole combination into the record sheet 46. The selection of the punch-

ing stamps is effected in according with the numeral to be punched in a similar way as the selection of the printing type in Fig. 2. For each record column there is a notched bar **33'** provided which is drawn upwardly by means of spring **350** in a similar way as the type bar of the printing mechanism in Fig. 2; each punch bar may be arrested in different positions by the pawl **37** under the control of the selector magnet **60**. The bar **33'** is connected with the bar **52** by a cross piece **51** and the bar **52** carries four resiliently mounted pins **53** which are spaced as shown in the drawings. If the bar **52**, **33'** is in the lowermost position, the uppermost pin **53** is just for one tooth **39** below the lowermost slide **96**, and if the bar **52** is in its uppermost position (the lowermost and uppermost positions are indicated by dotted lines) the lowermost pin **53** is for one tooth **39** above the uppermost slide **96**. In all intermediate positions, however, one or a plurality of the pins **53** will be adjusted opposite the slides **96** and if then in the way still to be described the plate **58** is moved to the right, the selected punching stamp or punching stamps **93** respectively will be pressed under the control of the pins **53** and the slides **96**, **95** through the record sheet **46**, and upon return movement of the plate **58** the punches will also return under the influence of their springs to their home position. The perforation scheme with respect to the various positions of the bar **33** may be clearly seen from Fig. 7 and may be verified on Fig. 5; in said Fig. 5 is the punching bar so adjusted that the numeral "5" will be punched, in accordance with Fig. 2 in which the type "5" is in printing position. For reasons of clarity it is still to be mentioned that the hole positions pass in the sequence of **9** to **0** under the brush and that consequently also the type and punching stamp bars rise in the same sequence from the lowermost to the uppermost position through the various numerical positions. The adjustment of the selector bar **33'** is effected by the selector magnet **60**. During the machine cycle the type bars **30** (Fig. 2) and simultaneously therewith also the punching bars **33'** are raised by the same mechanism which has been previously described. At the end of the machine cycle, and in the same moment in which in the printing mechanism the type hammers are impelled towards the record sheet, the points of two cams **56** rotating once during each machine cycle will encounter the fingers **57** of a frame **58** being guided upon pins of the casing, said frame being normally held by springs **55** in engagement with the cam disks **56**. The points of the cams **56** will move the frame **58** and the pins **53** lying just opposite said frame to the right, and consequently also the slides **96** and levers **95** will be moved far enough to press the corresponding punching stamps **93** through the record sheet **46** while all other punching stamps, i. e. those punching stamps to which no pins **53** are coordinated between their slides **96** and the plate **58** will be inoperative and no perforation will be caused thereby. After perforation has been effected and printing has taken place in the previously described way, all parts will return to their home positions and consequently also the punching bars **52**, **33'** will return under the influence of the cross head **30** to their home positions.

Controlling of zero punching upon item perforation as well as upon perforation of a number under the control of the accumulator is effected (in a similar way as has been already explained in connection with the type bar) by means of a pivotally mounted lever **120** encountering either a recess **123** or a projection **124**. Consequently, in all places being to the right of the highest numerical place the zeros will be automatically punched while in all places to the left thereof the bars **52** will raise for one unit higher so that the lowermost pin **53** moves beyond the uppermost slide **96** and consequently no perforation will be effected at all in the respective punching column.

The distance of the perforation from the side edge of the record sheet determines the denominational value of said perforation, however, the meaning of the perforation is not yet unequivocally determined. For this purpose there is a special standard point punching stamp provided which produces each time a record perforation is effected a hole on the same predetermined position which hole is invariably at the level of the lowermost hole position of the record perforation and which is therefore adapted to determine the meaning of the hole combinational records. The device for producing the standard point hole may be seen from Figs. 5 and 8. On opposite side walls of the casing are two bell crank levers **160** (in the drawings is only the lever lying on the one side shown) pivotally mounted which are connected with one another by a cross bar **161** which is normally drawn by a spring **163** against the left edge of the bars **52**. Each bar **52** has a recess **54** which is just opposite the yoke **161** if the bar **52** is in its uppermost position (i. e. for one step above the zero position). The recesses **54** of all perforation bars **52** will therefore be just opposite the yoke **161** if all bars **52** are in their uppermost position, i. e. if no record perforation will be effected at all. In this instance the spring **163** will draw the yoke **161** into the recesses **54** and consequently the bell crank levers **160** will be rocked so that also (see Fig. 8) the arm **162** will be drawn downwardly and the arm **164** connected therewith by a pin and slot connection will be moved downwardly. Said arm **164** as well as the arm **162** are, of course, to the left of the extreme left punching column; the arm **164** is pivotally connected with the punching plate **58** and lies normally opposite of a slide **166** adapted to cooperate with the standard point hole punching stamp **167**.

The cams **56** rotate, of course, only during printing cycles so that only then a perforation will be effected provided the bars **52** are adjusted in punching position. If now for instance in connection with total taking no perforation shall be effected the selector magnets **60** will not be energized and all bars **52** will raise to their uppermost position so that in each of such cycles the arm **164** (Fig. 8) is rocked lower than the slide **166**; consequently, if the bars **52** are in their uppermost positions there will be neither a record perforation nor a standard point hole perforation effected; however, if through one or a plurality of the bars **52** a record perforation is effected, the lever **160** is prevented from rocking in a clockwise direction so that simultaneously with each movement of the plate **58** to effect a record perforation also a standard point hole will be punched.

As will still be explained, with group accounts and printing of each individual item, the group designations are usually punched only to the first item of each group so that in such accounts

the space required for the perforations needs no particular consideration since said group accounts require in any way a longer record sheet than is required for the perforation. However, if only totals are to be printed or if a perforation shall be entered to each item the record sheet must receive larger feed steps since the perforation requires a larger space in vertical direction than the printing line. The device serving for this purpose is shown in Fig. 10 showing the device adjusted for normal linewise typeprinting. The lever 153 having a projection 155 is raised synchronously with the printing mechanism, rocking thereby a lever 152 which is pivotally mounted at 153 and which engages with its pin 151 into a slot 150 of a lever 148 pivotally mounted upon the shaft 86 of the printing platen and being normally drawn upwardly by a strong spring 149. At the left end of the lever 148 is a shift pawl 144 pivotally mounted engaging with a sidewardly extending projection into the teeth of the ratchet wheel 147 being fast to the platen roller and being held in its position by the bell crank lever 146. If the lever 148 is rocked in clockwise direction consequently to the raising of bar 156 (turning thereby the pawl 144 for the amount of three teeth) the roller 145 of the shift pawl 144 will encounter a plate 140 and will thereby be moved out of engagement with the ratchet wheel. Upon the return movement of the arm 156 the pawl 144 will be moved downwardly under the influence of spring 149; however, the roller 145 will slide upon the plate 140 long enough so that the shift pawl will skip two teeth and will engage only the third tooth thereby effecting a shift step corresponding only to the length of one tooth which corresponds just to the normal distance between two printing lines. This adjustment of the record sheet feed mechanism is for instance used in connection with the above menticned group accounts. However, if a perforation has to be effected to each printing line the plate 140 is adjusted in the position shown in Fig. 10 in dotted lines and is secured by means of the set screw 141. The pawl 144 will then be in engagement with the ratchet wheel during the whole backward stroke of the lever 148 and consequently the pawl will rotate the platen for three teeth thereby effecting a sufficient distance between the various record lines and providing a suitable blank space between the various perforations coordinated to the printed lines.

Now the various manners of operation in connection with perforation shall be described with reference to the circuit diagram of Fig. 1.

If it is desirable to punch to each item the identification represented in a certain hole field of the record card, such as for instance the account number, the selector magnets 60 are inserted immediately between the plug contacts 74 and 75 so that the magnets are from the analyzing brushes 11 immediately in series with the accumulator magnets 940 and the printing magnets 380. The selector bars of the punching mechanism are locked in a mechanical way after instantaneous energization of the magnets 60 while the printing and accumulator magnets are included over the contact 317 into a shunt circuit. Since the records to be perforated are usually group indications or identification designations, total punching will usually not be effected; however, the total may be taken from the accumulators and punched in the above described way without difficulty. In this case, the selection and adjustment of the various switches of the tabulating machine must be effected in the known way for "item printing" so that the various items will be printed and a perforation will be entered to each item in the above described way, said perforation corresponding the the perforation of the record field selected for said purpose, with the only difference that the respective number is represented upon the card according to the single hole system while the perforation upon the record sheet is effected according the hole combinational system; it will, of course, be understood that the invention is independent of the system of perforation.

If group accounts are to be made by means of the automatic group control mechanism it may be desirable to punch the identification or group designation to the first item of each group but to suppress the perforation for each following item of the same group. Further, it may be desirable to print to the first item (in addition to the perforation) the group number as well as to all other items, or to print said group number only to the first item. In the latter instance (i. e. that the group number is to be punched and printed only in connection with the first item) the magnets 60 and the group indicator contacts 48 must be inserted between the plugs 74 and 75, the magnets 60 lying in series with the contacts 48. After the passage of the first card the selector magnets 60 and the printing magnets are switched off from the analyzing brushes due to the interruption of the contacts 48, after the group number has been entered into the accumulator by means of magnets 940. With the following items there will be no printing of the group number and also no perforation of the same, and only upon total taking the group number which has been entered into the accumulator will again be printed by the printing magnets but it will not be punched in the present instance. If it is desirable to print the group number to each item, to punch, however, said number only to the first item of each group, the magnets 60 and contacts 48 are switched in series between the plug contacts 98 and 75. This will cause that after the passage of the first card consequently to the interruption of the group indicator contacts 48 the magnets 60 will be switched off from the current circuit, and consequently no perforation can be effected during the following items. Simultaneously with the aforesaid switch connection, however, also a direct connection must be made between the contacts 74 and 75 so that the group numbers are entered each time into the printing mechanism and are printed to each item. Also in this instance the group number will normally not be printed together with the total.

Another manner of operation consists therein that all items are only accumulated (but not printed) and then only the total of each group of items may be printed. In this instance it may be desirable that the group number be also punched to the total and, if desirable, the group number may also be printed. For this purpose the magnets 60 are connected parallelly to the printing magnets 380 directly to the plug contacts 99; the group indicator contacts 48 are switched between the plug contacts 74 and 75 so that the group number of the first card is entered into the accumulator and remains adjusted in the same. During the following accumulation of the data of the subsequent cards of a group the printing mechanism will not be

actuated, and if then upon total taking the printing magnets **380** are energized in accordance with the adjustment of the accumulator, the parallelly arranged selector magnets **60** will be energized simultaneously with the magnets controlling printing of the group indication so that the group number will be perforated as well as printed. If it should be desirable to punch the group number without printing the same it is only necessary to exclude the magnets **380** and insert in place thereof the selector magnets **60**. Punching of the group number in totalling operations is, of course, not restricted to the above described ways. It is also possible, as in known tabulating machines, to print the group number under the immediate control of the first card and to punch the same, and then entering the total after completion of the group accumulation. If this manner of operation is chosen it is only necessary to switch the magnets **60** and contacts **48** in series between the plugs **74** and **75**.

By means of the above described machine, of course, group accounts of the described kind may also be made without printing the total to each group. For this purpose the group control mechanism is rendered operative and the total taking switches are opened so that only the items of each group will be printed. As has been mentioned above in connection with total printing in group accounts, it is also possible in preparing group accounts without total printing, to punch the group number to the first item of each group and to print the same in addition to said perforation either only to the first item or to all items of the respective group.

What I claim is:

1. In an automatic perforated record card controlled punching and printing tabulating machine, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, means for automatically feeding a continuous record sheet step by step in accordance with the passage of the subsequent record cards past said analyzing means, punching means for perforating said record sheet, printing means for printing upon said record sheet, both said punching and printing means being under the common control of said analyzing means, means for causing said punching and printing means to subsequently perforate and simultaneously print upon said record sheet in accordance with the perforations on said record cards, an automatic group control mechanism responsive to changes in the perforations of record columns of subsequent cards controlling commonly said punching and printing means, and means under the control of said group control mechanism for rendering the punching means inactive after the passage of the first card of each group.

2. In an automatic perforated record card controlled punching and printing tabulating machine, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, means for automatically feeding a continuous record sheet step by step in accordance with the passage of the subsequent record cards past said analyzing means, punching means for perforating said record sheet, printing means for printing upon said record sheet, both said punching and printing means being under the common control of said analyzing means, means for causing said punching and printing means to subsequently perforate and simultaneously print upon said record sheet in accordance with the perforations on said record cards, an automatic group control mechanism responsive to changes in the perforations of record columns of subsequent cards controlling commonly said punching and printing means, and means under the control of said group control mechanism for rendering both the punching and printing means inactive after the passage of the first card of each group.

3. In an automatic perforated record card controlled punching and printing tabulating machine, analyzing means for the record columns of said cards, means for automatically feeding said record cards one by one past said analyzing means, means for automatically feeding a continuous record sheet step by step in accordance with the passage of the subsequent record cards past said analyzing means, punching means for perforating said record sheet, printing means for printing upon said record sheet, said punching means and a part of said printing means being under the common control of the analyzing means for predetermined record columns, and the other part of said printing means being under the control of analyzing means for other record columns, means for causing said punching and printing means to subsequently perforate and print upon said record sheet in accordance with the perforations on said record cards, an automatic group control mechanism responsive to changes in the perforations of record columns controlling commonly punching as well as printing means, and means under the control of said group control mechanism for rendering only said punching means inactive after the passage of the first card of each group.

4. In an automatic perforated record card controlled punching and printing tabulating machine, analyzing means for the record columns of said cards, means for automatically feeding said record cards one by one past said analyzing means, means for automatically feeding a continuous record sheet step by step in accordance with the passage of the subsequent record cards past said analyzing means, punching means for perforating said record sheet, printing means for printing upon said record sheet, said punching means and a part of said printing means being under the common control of the analyzing means for predetermined record columns, and the other part of said printing means being under the control of analyzing means for other record columns, means for causing said punching and printing means to subsequently perforate and print upon said record sheet in accordance with the perforations on said record cards, an automatic group control mechanism responsive to changes in the perforations of record columns controlling commonly punching as well as printing means, and means under the control of said group control mechanism for rendering both the punching and printing means commonly controlled by the analyzing means of said predetermined record columns inactive after the passage of the first card of each group.

5. In a printing and punching mechanism for a record sheet, a rotatable feeding roller platen for feeding said record sheet past said printing and punching mechanism, a matrix plate stationarily mounted in a recessed groove of said platen, a plurality of punching stamps opposite said matrix, means for selecting said punching means either singly or in different combinations, said punch selecting means being adjustable in equal steps relatively to said punching means,

selecting means for said printing means, said selecting means being also adjustable in equal steps relatively to said platen, the adjusting steps of said punch selecting means and of said printing selecting means being also equal.

6. In a printing and punching mechanism for a record sheet, a rotatable feeding roller platen for feeding said record sheet past said printing and punching mechanism, a matrix plate stationarily mounted in a recessed groove of said platen, a plurality of punching stamps opposite said matrix, means for selecting said punching means either singly or in different combinations, said punch selecting means being adjustable in equal steps relatively to said punching means, selecting means for said printing means, said selecting means being also adjustable in equal steps relatively to said platen, the adjusting steps of said punch selecting means and of said printing selecting means being also equal, means for controlling said punching and printing means, both said punching and printing means being under the common control of said controlling means.

7. In a record card controlled machine, analyzing means for said record cards, a printing and punching mechanism for a record sheet, said mechanism including a rotatable feeding roller platen for feeding said record sheet past said printing and punching mechanism, a matrix plate stationarily mounted in a recessed groove of said platen, a plurality of punching stamps opposite said matrix, means for selecting said punching means either singly or in different combinations, said punch selecting means being adjustable in equal steps relatively to said punching means, selecting means for said printing means, said selecting means being also adjustable in equal steps relatively to said platen, the adjusting steps of said punch selecting means and of said printing selecting means being also equal, said punching and printing means being under the common control of said record cards.

8. In a printing and punching mechanism for a record sheet, a rotatable feeding roller platen for feeding said record sheet past said mechanism, a matrix plate stationarily mounted in a recessed groove of said platen, a plurality of adjacent rows of punching stamps opposite said matrix, each row arranged in a plane perpendicular to the axis of the platen roller, the record sheet being fed between said punching stamps and said matrix plate, a selecting bar for selecting the punching stamps in each row, said selecting bars being adjustable in equal steps relatively to said punching stamps, a type bar coordinated to each row of punching stamps, said type bar being also adjustable in equal steps relatively to said platen, the adjusting steps of said selecting bars and said type bars being also equal.

9. In a printing and punching mechanism for a record sheet, a rotatable feeding roller platen for feeding said record sheet past said printing and punching mechanism, a matrix plate stationarily mounted in a recessed groove of said platen, a plurality of punching stamps opposite said matrix plate, means for selecting said punching means, said punch selecting means being adjustable in equal steps relatively to said punching means, selecting means for said printing means, said selecting means being also adjustable in equal steps relatively to said platen, the adjusting steps of said punch selecting means and of said printing selecting means being also equal.

10. In a printing and punching mechanism for a record sheet, a rotatable feeding roller platen for feeding said record sheet past said printing and punching mechanism, a plurality of adjacent rows of punching stamps, said rows being perpendicular to the axis of the roller platen, a selecting bar for selecting said punching stamps either singly or in different combinations, said bar being adjustable in equal steps relatively to said punching stamps, a plurality of type bars constituting said printing means, each type bar being also adjustable in equal steps relatively to said platen, the adjusting steps of said punch selecting bars and of said type bars being also equal.

11. In a record card controlled machine, analyzing means for said record cards, a printing and punching mechanism for a record sheet, a rotatable feeding roller platen for feeding said record sheet past said printing and punching mechanism, a plurality of adjacent rows of punching stamps, said rows being perpendicular to the axis of the roller platen, a selecting bar for each row for selecting said punching stamps either singly or in different combinations, said bar being adjustable in equal steps relatively to said punching stamps, a plurality of type bars constituting said printing means, each type bar being also adjustable in equal steps relatively to said platen, the adjusting steps of said punch selecting bars and of said type bars being also equal, said punch selecting bars and said type bars being under the common control of said analyzing means.

12. In an automatic perforated record card controlled machine, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, means for automatically feeding a continuous record sheet step by step in accordance with the passage of the subsequent record cards past said analyzing means, punching means adapted to perforate said record sheet, means for printing upon said record sheet, both said punching and printing means being under the common control of said analyzing means, and means for causing said punching and printing means to subsequently perforate and print upon said record sheet in accordance with the perforations on said subsequent record cards, an automatic group control mechanism responsive to changes in the perforations of record columns of subsequent cards controlling commonly said punching and printing means, and means under the control of said group control mechanism for modifying the operation of the machine upon a change in the perforations of the card columns controlling said punching and printing means.

13. In an automatic perforated record card controlled punching and printing tabulating machine, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, means for automatically feeding a continuous record sheet step by step in accordance with the passage of the subsequent record cards past said analyzing means, punching means for perforating said record sheet, printing means for printing upon said record sheet, both said punching and printing means being under the common control of said analyzing means, means for causing said punching and printing means to subsequently perforate and simultaneously print upon said record sheet in accordance with the perforations on said record cards, an automatic group control mechanism responsive to changes in the perfora-

tions of record columns of subsequent cards controlling commonly said punching and printing means, and means under the control of said group control mechanism for rendering the printing means inactive after the passage of the first card of each group.

14. In an automatic perforated record card controlled punching and printing tabulating machine, analyzing means for the record columns of said cards, means for automatically feeding said record cards one by one past said analyzing means, means for automatically feeding a continuous record sheet step by step in accordance with the passage of the subsequent record cards past said analyzing means, punching means for perforating said record sheet, printing means for printing upon said record sheet, said punching means and a part of said printing means being under the common control of the analyzing means for predetermined record columns, and the other part of said printing means being under the control of analyzing means for other record columns, means for causing said punching and printing means to subsequently perforate and print upon said record sheet in accordance with the perforations on said record cards, an automatic group control mechanism responsive to changes in the perforations of record columns controlling commonly punching as well as printing means, and means under the control of said group control mechanism for rendering the printing means controlled by the punching means controlling analyzing means inactive after the passage of the first card of each group.

15. In an automatic perforated record card controlled machine, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, punching and printing means, both said punching and printing means being under the common control of said analyzing means upon the analysis of the subsequent cards, an automatic group control mechanism responsive to changes in the perforations of record columns of subsequent cards controlling commonly said punching and printing means, and means under the control of said group control mechanism for rendering the punching means inactive after the passage of the first card of each group.

16. In an automatic perforated record card controlled machine, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, punching and printing means, both said punching and printing means being under the common control of said analyzing means upon the analysis of the subsequent cards, an automatic group control mechanism responsive to changes in the perforations of record columns of subsequent cards controlling commonly said punching and printing means, and means under the control of said group control mechanism for rendering both the punching and printing means inactive after the passage of the first card of each group.

17. In an automatic perforated record card controlled machine, analyzing means for the record columns of said cards, means for automatically feeding said record cards one by one past said analyzing means, punching means and printing means, said punching means and a part of said printing means being under the common control of the analyzing means for predetermined record columns, and the other part of said printing means being under the control of analyzing means for other record columns, means for actuating said punching and printing means upon the analysis of each of said subsequent record cards, an automatic group control mechanism responsive to changes in the perforations of record columns controlling commonly punching as well as printing means, and means under the control of said group control mechanism for rendering said punching means inactive after the passage of the first card of each group.

18. In an automatic perforated record card controlled machine, analyzing means for the record columns of said cards, means for automatically feeding said record cards one by one past said analyzing means, punching means and printing means, said punching means and a part of said printing means being under the common control of the analyzing means for predetermined record columns, and the other part of said printing means being under the control of analyzing means for other record columns, means for actuating said punching and printing means upon the analysis of each of said subsequent record cards, an automatic group control mechanism responsive to changes in the perforations of record columns controlling commonly punching as well as printing means, and means under the control of said group control mechanism for rendering both the punching means and the printing means controlled by said common analyzing means inactive after the passage of the first card of each group.

19. In an automatic perforated record card controlled machine, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, punching means and printing means, both said punching and printing means being under the common control of said analyzing means upon the analysis of the subsequent cards, an automatic group control mechanism responsive to changes in the perforations of record columns of subsequent cards controlling commonly said punching and printing means, and means under the control of said group control mechanism for modifying the operation of the machine upon a change in the perforations of the card columns controlling said punching and printing means.

20. In an automatic perforated record card controlled machine, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, punching means and printing means, both said punching and printing means being under the common control of said analyzing means upon the analysis of the subsequent cards, an automatic group control mechanism responsive to changes in the perforations of record columns of subsequent cards controlling commonly said punching and printing means, and means under the control of said group control mechanism for rendering the printing means inactive after the passage of the first card of each group.

21. In an automatic perforated record card controlled machine, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, punching means and printing means, both said punching and printing means being under the common control of said analyzing means upon the analysis of the subsequent cards, an automatic group control mechanism responsive to changes in the perforations of record columns of subsequent cards controlling commonly said punching and printing means, and means for rendering the

printing means controlled by the punching means controlling analyzing means inactive after the passage of the first card of each group.

22. In an automatic perforated record card controlled machine, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, punching means and printing means both being under the common control of said analyzing means, an automatic group control mechanism responsive to changes in the perforations of record columns controlling commonly said punching and printing means, and means under the control of said group control mechanism for modifying the operation of the machine upon a change in the perforations of the card columns controlling said punching and printing means.

23. In an automatic perforated record card controlled machine, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, means for automatically feeding a continuous record sheet step by step in accordance with the passage of the subsequent record cards past said analyzing means, punching means adapted to perforate said record sheet, means for printing upon said record sheet, both said punching and printing means being under the common control of said analyzing means, an automatic group control mechanism responsive to changes in the perforations of record columns of subsequent cards controlling commonly said punching and printing means and means under the control of said group control mechanism for modifying the operation of the machine upon a change in the perforations of the card columns controlling said punching and printing means.

24. In an automatic machine controlled by perforated record cards according to the single hole system, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, punching means for producing combinational hole records, both said punching and said printing means being under the common control of said analyzing means, an automatic group control mechanism responsive to changes in the perforations of record columns controlling commonly said punching and printing means, and means under the control of said group control mechanism for modifying the operation of the machine upon a change in the perforations of the card columns controlling said punching and printing means.

25. In an automatic machine controlled by perforated record cards according to the single hole system, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, means for automatically feeding a continuous record sheet step by step in accordance with the passage of the subsequent record cards past said analyzing means, punching means adapted to perforate said record sheet by hole combinations, both said punching and printing means being under the common control of said analyzing means, an automatic group control mechanism responsive to changes in the perforations of record columns of subsequent cards controlling commonly said punching and printing means and means under the control of said group control mechanism for modifying the operation of the machine upon a change in the perforations of the card columns controlling said punching and printing means.

26. In an automatic perforated record card controlled machine, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, a separate set of punching means and a separate set of printing means, means for driving said punching and printing means in unison, both said punching and said printing means being under the common control of said analyzing means, an automatic group control mechanism responsive to changes in the perforations of record columns controlling commonly said punching and printing means, and means under the control of said group control mechanism for modifying the operation of the machine upon a change in the perforations of the card columns controlling said punching and printing means.

27. In an automatic perforated record card controlled machine, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, means for automatically feeding a continuous record sheet step by step in accordance with the passage of the subsequent record cards past said analyzing means, a separate set of punching means adapted to perforate said record sheet, a separate set of printing means for printing upon the same record sheet, means for driving said punching and printing means in unison, both said punching and printing means being under the common control of said analyzing means, an automatic group control mechanism responsive to changes in the perforations of record columns of subsequent cards controlling commonly said punching and printing means and means under the control of said group control mechanism for modifying the operation of the machine upon a change in the perforations of the card columns controlling said punching and printing means.

28. In an automatic machine controlled by perforated record cards according to the single hole system, analyzing means for said record cards, means for automatically feeding said record cards one by one past said analyzing means, means for automatically feeding a continuous record sheet step by step in accordance with the passage of the subsequent record cards past said analyzing means, a separate set of punching means adapted to perforate said record sheet by hole combinations, a separate set of printing means for printing upon the same record sheet, means for driving said punching and said printing means in unison, both said punching and said printing means being under the common control of said analyzing means, an automatic group control mechanism responsive to changes in the perforations of record columns of subsequent cards controlling commonly said punching and printing means and means under the control of said group control mechanism for modifying the operation of the machine upon a change in the perforations of the card columns controlling said punching and printing means.

29. In a perforated record card controlled machine, a printing and punching mechanism for a record sheet, a rotatable feeding roller platen for feeding said record sheet simultaneously past said printing and punching mechanism, a matrix plate stationarily mounted in a recessed groove of said platen, a plurality of punching stamps opposite said matrix and perforated record card controlled means for commonly controlling said punching stamps and said printing means.

30. In a printing and punching mechanism for

a record sheet, a rotatable feeding roller platen for feeding said record sheet past said printing and punching mechanism, a matrix plate stationarily mounted in a recessed groove of said platen, a plurality of punching stamps opposite said matrix, means for selecting said punching means, said punch selecting means being adjustable in equal steps relatively to said punching means, selecting means for said printing means, said selecting means being also adjustable in equal steps relatively to said platen.

MICHAEL MAUL.