Feb. 6, 1940. R. E. PARIS 2,189,044

PRINTING MECHANISM FOR TABULATING MACHINES

Original Filed March 22, 1929 3 Sheets-Sheet 1

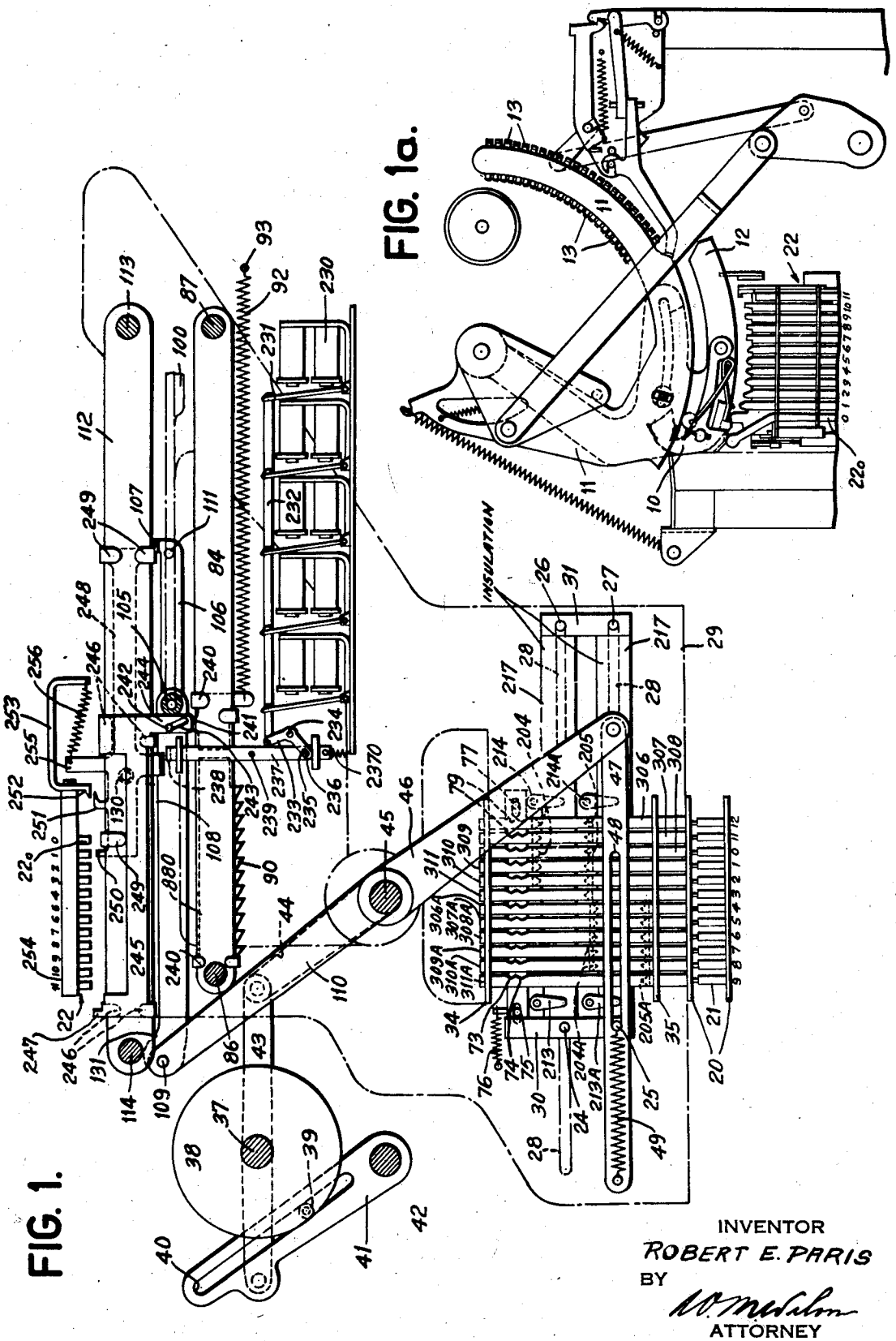


FIG. 1.

FIG. 1a.

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FIG. 2.

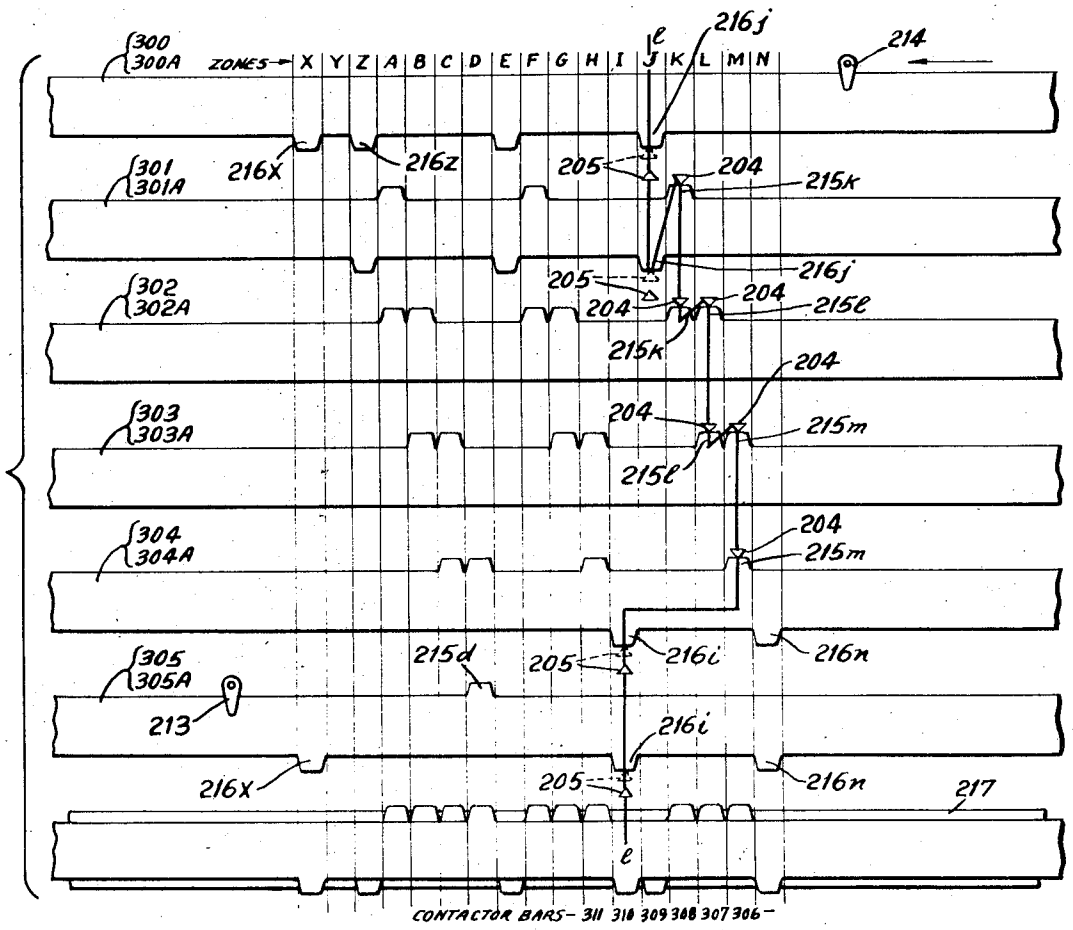
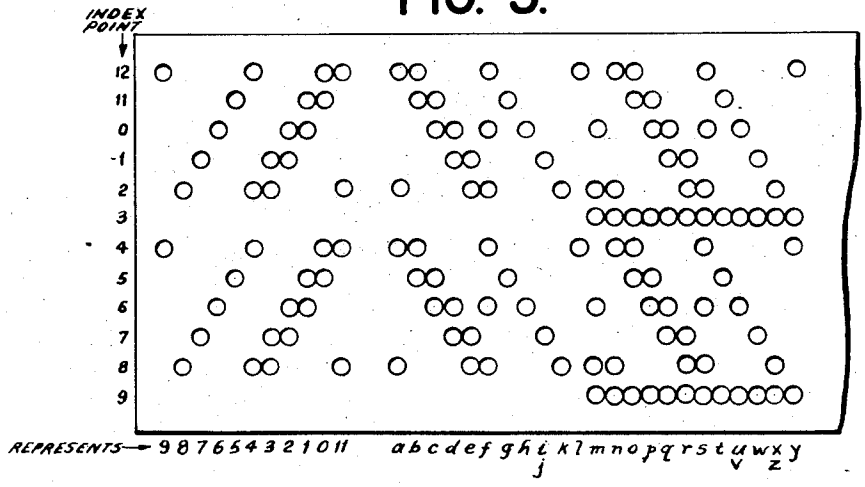


FIG. 3.



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FIG. 5.

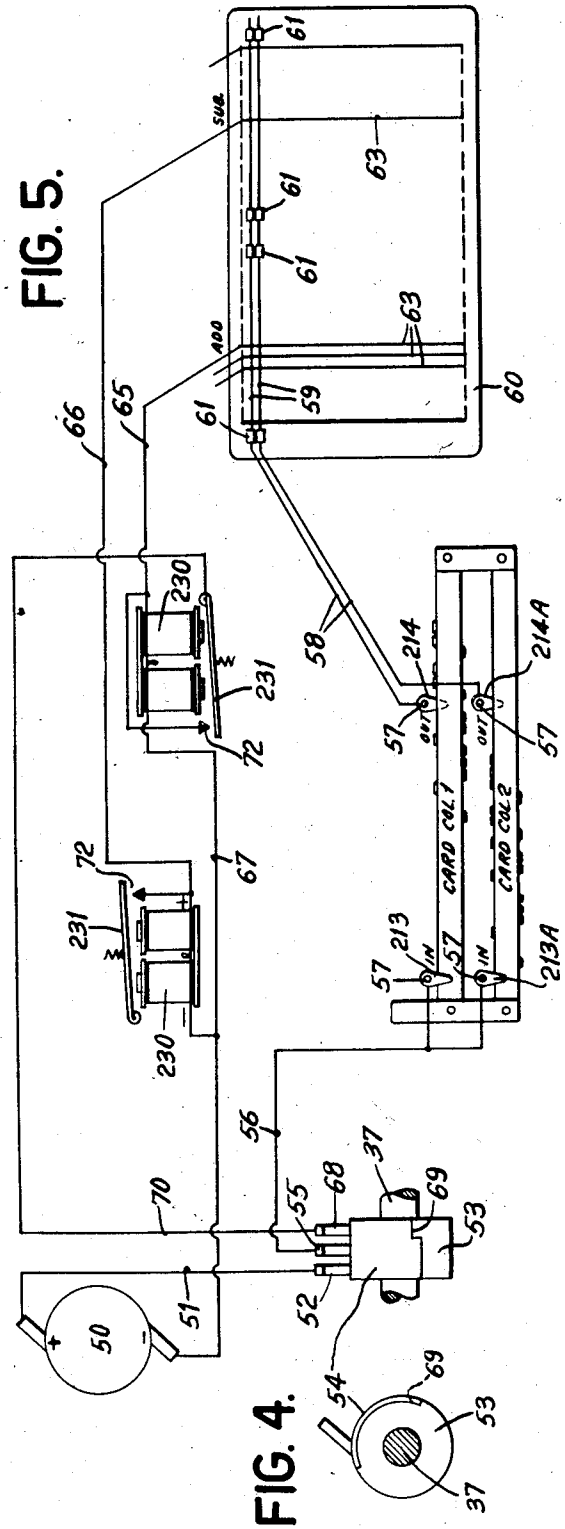


FIG. 4.

FIG. 6.

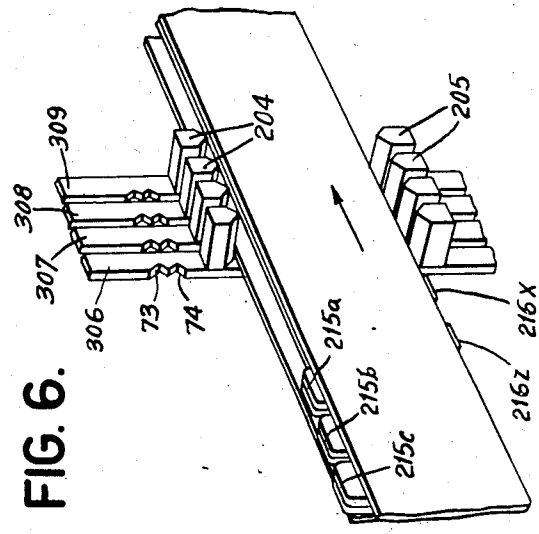


FIG. 8.

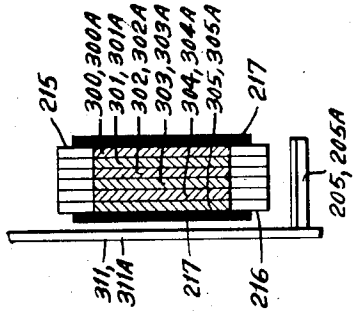
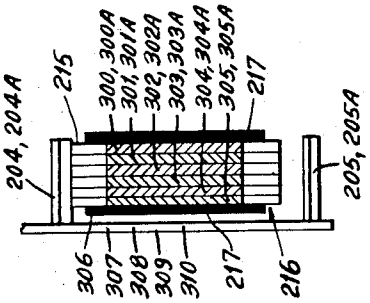


FIG. 7.



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UNITED STATES PATENT OFFICE

2,189,044

PRINTING MECHANISM FOR TABULATING MACHINES

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Original application March 22, 1929, Serial No. 349,080. Divided and this application July 10, 1936, Serial No. 89,943

10 Claims. (Cl. 101—93)

This application is a divisional application of the parent application Serial No. 349,080 now issued as Patent No. 2,047,519 dated July 14, 1936.

The parent application discloses and claims an improved arrangement for translating combinational hole punchings of a record card for the purposes set forth in the parent application. The record card disclosed in the parent application and in this application is punched with two lines of data, in an upper and lower deck fashion.

The present application is devoted solely to the disclosure of such combinational hole punchings for representing both numerical and alphabet data and discloses how the translator of such combinational hole punchings can control the selection of type for printing numerals and alphabet data.

It is a broad object of the present invention to devise a system for designating two or more horizontal lines of data on a single record card and to cause said record to control type printing mechanism so as to print the two lines of data on a single printing line of a data receiving sheet.

In record controlled alphabet type printing mechanism of the type heretofore constructed a single card column has been utilized for the representation of each letter so that no apparent difficulty has been experienced to print on a single line the data represented by the record.

The present invention doubles the data representing capacity by punching, preferably in the form of a code, and renders it possible to print the two lines of data represented by the code punchings in the upper and lower part of the card on a single line.

A more specific object of the present invention is to devise a type carrying bar so that it may be provided with two groups of type, and to translate combinational hole designations so as to select a desired group of type and a type in the selected group.

The invention has preferably been shown in connection with the Powers type of machine in which a member carries two groups of type, one of which is selected by the release of a latch. This latch effects the connection between the member carrying the type and a control member and when the latch is disabled a relative movement between the members is effected which causes the selection of the second group of type.

A further object of the present invention is to devise an arrangement for controlling the alphabet type printing mechanism of the Powers type of machine so that the groups of type may be selected under control of electrical instrumentalities.

In the preferred embodiment such instrumentalities comprise electromagnets of which there is one provided for each alphabet type printing column. The translator is adapted to effect the energization of the magnet at a predetermined point in the cycle of machine operation so as to select one of the tabulator stops which is operative to select a desired type. The selection of the groups may be effected, in the preferred embodiment, by one energization of the same electromagnet which effects type selection and is energized when a special punching is provided for selecting the other group of type. This energization of the electromagnet effects the operation of the aforementioned latch to select as has been previously explained the second group of type.

A still further object of the present invention is to provide an improved form of connection box and preferably of the electrical type, so as to effect the control of the alphabet type selecting magnets under control of pins which are responsive to the sensing of the perforations.

A more specific object of the present invention is to devise a system of combinational code punchings whereby pins of the well known form of sensing head of the Powers tabulator may respond to the presence of such perforations and to cause said pins to raise what is designated herein as contactor bars. These bars are, therefore, raised in response to the code punching and are subsequently correlated with contact carrying plates carrying contactors arranged in combinational form. This will effect a translation of the combinational code punching and, as has been subsequently explained will control the operation of a suitable alphabet printing mechanism.

Another object of the present invention is to provide a single set of permutation contacts which are operative for the selection of type in two different groups and to cause the same members which carry the permutation contacts to effect the selection of one of the groups of type, whereby the permutation contacts will be operated for the selection of type in this group.

While the invention has been shown in connection with a tabulator of the well known Powers type it should be understood that the disclosure is merely illustrative rather than restrictive. It will be apparent that many of the novel constructions and arrangement of parts may be applied to other forms of tabulating machines

and it is the desire not to restrict the invention to the embodiment disclosed herein.

With these and other objects in view as will be apparent as the specification proceeds, the invention resides in certain novel construction and combination and arrangement of parts, the essential features of which are hereinafter fully described and pointed out in the appended claims and illustrated in the accompanying drawings, in which:

Fig. 1 is a vertical sectional view showing the means for reading the data from the record cards and the improved means for alphabetical control.

Fig. 1*a* is a view in side elevation of a well known form of alphabet printer for the Powers tabulator.

Fig. 2 is a view showing the side elevation of all of the contact parts of a section and indicating graphically by zones how they combine for alphabetical control.

Fig. 3 is a fragment of a record card showing the numerical and alphabetical code punching.

Fig. 4 is an end view of the commutator.

Fig. 5 is a diagrammatic representation of a representative circuit.

Fig. 6 is an enlarged fragmentary detail perspective view showing a set of contact carrier plates and four of a set of six associated contactor bars.

Fig. 7 is an enlarged detail section of one set of contact carrier plates showing also one of the cooperative contactor bars, the proportions being exaggerated for the sake of clearness.

Fig. 8 is a view similar to Fig. 7 but shows the manner in which one of the contactor bars of a set of six is modified with respect to the other contactor bars.

Like characters of reference refer to like parts in all views.

Referring to the drawings, in detail, and in particular to Fig. 1, **20** represents the tabulator-pin-guide plate of the well known construction, familiar in the commercial field as the Powers tabulator; and **21** represents the tabulator pins guided by said plate. In the machine as at present constituted and commercially known, there are twelve pins **21** in each column.

It will be recalled from the known Powers tabulator as commercially on the market, that wherever a perforation occurs in the data card, a pin **21** will be raised in the event that there is a perforation and during the cycle of operation in which the card is passed through the machine. But in the known structure only one series or line of data is read from each data card, whereas in the present invention it is necessary to provide means for sensing two series or two lines of data and conducting the sensed data from each series to a different portion of the tabulator head so as to print the two lines of data on a single printing line. Such means is provided and will now be set forth.

It is at times necessary to devote a portion of the tabulator to the printing of alphabetical or symbolic matter, and in the Powers tabulator as at present constituted and disclosed in Fig. 1*a* (taken from the patent to Lasker No. 1,624,956, dated April 19, 1927), an alphabetical sector is used comprising two parts, one of which is a print sector **11** carrying two groups of type **13** and the other a control sector **12**. A relative movement of the two sectors is effected by releasing the latch **10** in said patent and is released by a perforation in the card controlling the zero stop 22_0 of the series of stops **22**, or the release finger **35** of said patent. In the present instance, a perforation in the "3" position or in the "9" position controls means for operating the zero stop 22_0 so as to release said latch **10**. This will permit print sector **11** to move relative to the control sector **12** in order that the second group of type **13** of the alphabetical print sector can be selected.

The alphabetical arrangement disclosed in said Lasker Patent No. 1,624,956 and used in the standard Powers alphabetical tabulators is controlled by a card which is punched as set forth in United States Patent No. 1,684,001. However, the code punching for the present machine has preferably been changed over this patent so as to punch two lines of matter on a single card although this matter may be transcribed as a single line by the tabulator of the present invention. A desirable alphabetical code punching is shown in Fig. 3 but this can be varied according to requirements using the well known six point combinational code. The specific control mechanism for alphabetical work is best shown in Figs. 1, 2, 4, 5, 6, 7 and 8 and is constructed as follows:

On the edge of the lower guide plate **20** for the pins **21** there have been placed in Fig. 1 the numerals "0" to "12" inclusive, indicating the values of the pins **21** in the Powers machine as at present on the market. Directly over the pins **21** are respective contactor bars which are indicated respectively as **306, 307, 308, 309, 310, 311, 306A, 307A, 308A, 309A, 310A,** and **311A**, the first six bars at the right being raisable by the pins co-operative with the upper half of the record card and the second six bars at the left by the pins cooperative with the lower half of the record card.

The several contactor bars **306—311, 306A—311A** are supported in upright position and guided in slots in plates **34** and **35** and normally rest upon the upper tabulator pin guide plate **20**. Inasmuch as each of these twelve contactor bars rests with its lower end immediately over a respective pin **21**, it is obvious that each contactor bar has an upper and lower position in one or the other of which the contactor bar will stand according to whether its pin **21** is raised or lowered. It will be remembered that a perforation in a record card permits raising of the respective pin **21** and consequently in the present construction will result in the raising of the respective contactor bar. It will be understood, of course, that there is one series of twelve contactor bars for each column of analyzing pins **21**, the several series being duplicates of each other.

Universal rods **24, 25, 26** and **27** are supported and guided in slots **28** in the framework **29**. Rods **24, 25, 26,** and **27** are either made of insulating material or are suitably insulated from parts with which they cooperate. Secured to rods **24, 25, 26** and **27** and movable therewith are a plurality of vertically disposed carriers or tie and spacing members **30** and **31** preferably made of insulating material, members **30** extending over the rod **24** for a purpose to be presently set forth. Mounted on the rods **24, 25, 26,** and **27** are two series of contact carrier plates one series above the other. Each series of contact carrier plates consists of six thin contact plates insulated from each other in any desired manner and all secured together and held between spacers **30** and **31** on rods **24, 25, 26** and **27**. The six plates of each upper series are indicated respectively in Fig. 2 by reference numerals **300, 301, 302, 303, 304** and **305** while those of the lower series are indicated at **300A, 301A, 302A, 303A, 304A** and **305A**, the

plates 300 and 305 of the upper series and 300A and 305A of the lower series being the outer plates of these series.

Each of the contactor bars 306, 307, 308, 309, and 310, carries (see Fig. 7) an upper laterally extending contactor or brush 204 and a lower laterally extending contactor or brush 205 and each of the contactor bars 306A, 307A, 308A, 309A, and 310A carries an upper laterally extending contactor or brush 204A and a lower laterally extending contactor or brush 205A. The contactor bar 311 is provided only with a lower laterally extending contactor or brush 205 (see Fig. 8) and the contact bar 311A is provided with a lower laterally extending contactor brush 205A, as their only function is to bridge directly across from plate 300 to 305 or from 300A to 305A whenever a punch occurs in the "3" or "9" position. The several brushes 204, 205 and 204A and 205A are insulated from their supporting contactor bars.

The purpose of these series of contact carrier plates will be now considered, bearing in mind that those having an "A" as part of the reference characters are co-operative with those contactor bars having an "A" as part of the reference characters. Current is conducted to the contact carrier plate 305 or 305A at one side of each series of plates by any desired means such as spring brushes 213 and 213A (Fig. 1), and brushes 214 and 214A contacting the contact carrier plates 300 and 300A at the other side of the series are provided with connections (later fully described) leading to desired electro-magnets 230. Thus when a circuit is completed through the contact carrier plates of any series the correlated magnet or magnets 230 are operated at the time of completing such circuit. An electro-magnet 230 is provided for controlling each column of the tabulator head. The means by which the contact carrier plates are connected at the proper instant includes contacts on the carrier plates and the brushes 204 and 205 and/or 204A and 205A. This means of connection will now be described.

As shown in Fig. 2 the plates 300—305 and 300A—305A are formed with upper contact fingers 215 and lower contact fingers 216; and the six plates of a series held between plates 217 of insulating material are of sufficient breadth to permit exposure of the ends only of the fingers 215 and 216 to the wiping action of the brushes 204, 205, 204A, and 205A. Normally, the brushes 204, 205, 204A and 205A are all down, so that the brushes 204 and 204A are in position to contact the several contact fingers 215 as they are moved across the brushes. But if any of the bars 306 to 311 and 306A to 311 is raised, then its brush 204 or 204A is raised out of effective relation to the contact fingers 215, and its brush 205 and 205A is raised into effective relation to the contact fingers 216.

It may be well at this point to consider Fig. 2 somewhat more in detail. It will be noted that the contact carrier plates have been divided into zones by vertical lines, the zones being indicated by the letters A to N and X to Z merely for designation purposes and should not be confused with the alphabet type which are selected by the contact carrier plates. The width of a zone is the distance between the centers of the contactor bars 300 to 305 or 300A to 305A. The contact fingers 215 and 216 within these various zones have subscripts with the letter of that zone. These contact fingers have been so arranged that for each of the above described code punchings of the card there will be only one position at which the circuit will be closed through the six contact bars and that position will be such that the operation of the correlated magnet 230 will control the parts of the machine according to such code punching. The contact carrier plates 300—305 have been shown here as identical with contact carrier plates 300A—305A which is correct as far as the relation of the contact fingers is concerned but, of course, the contact carrier plates themselves are made with the entire series of contact fingers arranged to coact with the respective brushes.

Considering now the means for causing contact plates 308—311 and 308A—311A to traverse the brushes 204—205 and 204A—205A, 37 (Fig. 1) represents a rotating drive shaft of the tabulator. Upon the end of this shaft 37 is pinned a disk 38 carrying a laterally extending pin 39 which rides in a slot 40 formed in a rocker 41 pivoted at 42 and connected by a link 43 to one end of an arm 44, the other end of which is fast on a rock-shaft 45. This rock shaft 45 carries a pair of depending arms 46 to which are pivoted links 47 formed with slots 48 through which the rod 25 extends. Springs 49 anchored at one end to the links 47 and at the other to the rod 25 tend to constantly hold such rod in the left-hand ends of slots 47 as viewed in Fig. 1.

It will now be apparent that rotation of shaft 37 will cause rotation of disk 38 which will cause pin 39 to effect rocking of rocker 41, whereby link 43 will be caused to rock arm 44, shaft 45 and depending arms 46. This causes reciprocation of links 47 and rod 25. Rods 24, 25, 26 and 27 together with the tie and spacing members 30 and 31 and the several series of contact carrier plates form a unit so that reciprocation of rod 23 effects reciprocation of all of the contact carrier plates so as to traverse the several brushes 213, 214, 213A and 214A.

Turning next to the circuits (see Fig. 5) closed by the completing of the connection from one outside plate to the other of any series of contact plates 300—305 and 300A—305A, a suitable source of electric energy is indicated at 50 from which current is passed over a lead 51 to a brush 52 which contacts a rotary commutator body 53 mounted on shaft 37 for rotation thereby and having a contact strip 54. A second brush 55 also contacts the periphery of commutator 53 and is connected by a lead 56 and branches thereof to the several spring brushes 213, 213A. Brushes 213, 213A, 214 and 214A are supported on through rods 57, and while the rods 57 of brushes 213, 213A need not be of insulating material, the rods 57 of brushes 214, 214A must be of insulating material or suitably insulated from the brushes mounted thereon. Each brush 214, 214A is connected by a respective lead 58 to a respective metal cross rod 59 of the connection box 60; and each cross rod 59 may be connected by means of metal sliding connectors 62 to any one of a plurality of vertical metal strips 63. The connection box 60 is fully described in my Patent No. 2,063,118, dated December 8, 1936.

The slides 62 are provided with fingerpieces whereby they may be moved along their respective cross rod 59 to make a selective connection with a metal strip 63. It will thus be seen that by moving any slide 62 along its cross rod 59 any one of the magnets 230 may be brought into circuit with any one of the brushes 214, 214A. By the proper selective connections the upper

line of data on the card of Fig. 3 is sensed to control a series of printing control magnets 230 to print the data on a line and by proper selective connections the lower line of data on the card of Fig. 3 is sensed to control a series of printing control magnets 230 to print this data on the same printing line.

While only shown for two magnets 230 each of the vertical strips 63 is connected to one side of a magnet 230 by a lead 65. The other sides of all of the magnets 230 are grounded to a lead 67 back to the source 50.

In order to hold the several magnets 230 energized after the same have been energized and during such portion of cycle as is necessary, even though the line contacts 215 and 216 may have passed out of circuit closing position, there is provided what is known as holding circuits for these magnets. A third brush 68 contacts the commutator disk 53, and a portion of the contact strip 54 is notched at 69 so that this brush will not contact strip 54 until shortly after brushes 52 and 55. This brush 68 is connected by a lead 70 and branches to the armature 231 of each and every magnet 230. The positive or inlet side of each magnet 230 is connected to a respective contact 72 positioned to be engaged by the armature 231 of the respective magnet when in closed position. Hence when once the armature of a magnet 230 is closed it will be held closed by the circuit from 50 through 51, 52, 54, 68, 70, 231, 72, magnet 230 and to 67, until this circuit is broken by the rotation of commutator disk 53 sufficiently to bring contact strip 54 out of engagement with brushes 52 and 68. During this time the mechanism of the tabulator head has completed its recording of the required alphabet characters.

With contactor bars 306—311 and 306A—311A (see Fig. 1) have been raised means are provided for locking raised bars in raised position and unraised bars in normal position. For this purpose, each of these contactor bars is provided with an upper notch 73 and a lower notch 74. The upwardly extending portions of members 30 hereinbefore mentioned, normally contact a cross rod 75 and hold it to the right in Fig. 1 against the tension of springs 76. This rod 75 together with another rod 77 and a plurality of cross strips 78 form a locking frame. This locking frame is supported and guided by projecting the ends of rods 75 and 77 through short slots in the framework. Each cross strip 78 is provided with lateral pins 79 for engagement with the notches 73 or 74 of the bars 306—311 and 306A—311A. Preferably there is only one bar 78 for each two rows of bars 306—311 and 306A—311A, the pins 79 projecting on both sides of bars 78 so as to coact with the adjacent bars 306—311 and 306A—311A on each side of each bar 78. As soon as the members 30 start their excursion toward the left in Fig. 1, the locking frame is permitted to follow up until its pins 79 engage the notches 73 of all lowered bars and the notches 74 of all raised bars. Upon the return of members 30 the locking frame is forced back to ineffective position, and the raised bars 306—311 or 306A—311A drop back to lowered position. Thus springs 76 offer no resistance to bars 306—311 and 306A—311A while being raised and lowered, but hold them in proper position during the required portion of the cycle.

Bars 84 (Fig. 6) are mounted on two cross rods 86 and 87 and are spaced apart in any suitable manner, there being one bar 84 for each row of stops 22. The bars 84 are positioned directly beneath the respective rows of stops 22. Slidably mounted on each bar 84 is a slider 880. To the slider 880 there is secured a spring 92 anchored to any suitable stationary part such as rod 93, and tends constantly to draw the sliders 880 to the right as seen in Fig. 1.

The magnets 230 are provided with the armatures 231 each of which is connected by a link 232 with a bell-crank 233 pivoted on a rod 234.

The lower arm of this bell-crank is provided with a slot 235 in which rides a pin 236 of a vertically movable bar 237 provided at its upper end with a turned over finger 238 and intermediate its ends with a stop pin 239. The mechanism is so timed that when one of the magnets 230 is operated by the bridging of the contacts 216X, see Fig. 2 (i. e., where there is a perforation in the "3" or "9" position) the brush 68 will be in the notched out portion 69 (Fig. 4) of the commutator and consequently this magnet will be operated and then let go as its holding circuit will not have been closed by contact of brush 68 with the contact strip 54. The vertically movable bar 237 connected with this particular magnet will, therefore, be raised and then lowered by a spring 2370, which will set mechanism for operating the zero stop 22 for releasing the alphabetical sector, which mechanism will now be set forth.

In that unit of the mechanism devoted to alphabetical work each of the sliders 880 mounted on the rails 84 is formed in a single piece having ears 240 slidably securing the respective slider 880 to the respective rail 84 and formed with teeth 90 and with an upwardly extending finger 241 carrying a pin 242 extending through a slot 243 in the depending finger 244 of a slider 245 mounted on a respective rail 112. The rails 112 are pivoted at one end on the stationary rod 113 and at the other end are connected to the universal bar 114 which merely rests on some stationary part of the machine to thus hold the bar 114 and rails 112 upwardly. The slider 245 is formed with ears 246 embracing and slidably securing the slide 245 to the rail 112, and carries a stop-lifting finger 247. Also mounted on each rail 112 is a second slider 248 provided with ears 249 which embrace the rail 112 in such manner that the slider 248 is slidable along the rail and cross-wise of the rail so as to render its stop-raising finger 250 effective for raising the zero stop 22 of the tabulator. The slider 248 is provided with an upwardly projecting hook element 251 which is adapted to engage and hook into a retaining ledge 252 formed on a member 253 carried by the guide plate 254 of the pins 22. The slider 248 is also provided with an upwardly extending finger 255 to which one end of a diagonally disposed spring 256 is attached, the other end of the spring being attached to the member 253 as shown in Fig. 1. The spring 256, therefore, tends constantly to pull the slider 248 toward the right in Fig. 1 and also to keep the free end of the slider down in contact with its rail 112. The connected fingers 241 and 244, of sliders 880 and 245 contact rod 105, and slider 245 engages the upstanding spring finger 255 to hold the slider 248 normally to the left. Rod 105 forms part of a frame having side bars 106 and a cross tie rod 107 which frame is reciprocated at each cycle of the machine by links 108 pivotally connected to 105 and at 109 to upper arms 110 secured to and rocked by shaft 45. The frame 105, 106, 107 is supported and guided by extending bar 105 into slots 400 in the frame work and by forming the members 106 L-shaped and ex-

tending studs 111 through, parallel with 107, and in the same horizontal plane as 105, so they may somewhat extended ride in the same slots 400.

When, however, a punch occurs in a position other than "3" or "9" position, the required magnet 230 is operated after brush 68 has left notch 69 and the holding circuit holds the magnet energized, the pin 239 having engaged the proper tooth 90, and being held so as to maintain finger 247 under the proper stop 22. Of course where there are double punchings, both the stop 250 and stop 247 will be brought to operative positions and will raise respective stops 22 when the universal bar 114 is raised. In order to rock the frame comprising the bar 114 and rails 112 so as to effect raising of all the desired stops 22, the outer member 112 is provided with a roller 130 (Fig. 1) which is engaged and raised by a cam portion or lug 131 on member 108 when it nears the end of its excursion to the right in Fig. 1. It may be well at this point to note that when the stop finger 250 is to be set for active work (i. e., when a hole is punched in "3" or "9" position), the bar 237 is operated at approximately the instant that rod 105 starts its rearward excursion. This rocks slide 248 slightly so as to bring hook 251 into position to hook on ledge 252. As bar 105 is moving rearwardly, spring 256 draws hook 251 onto ledge 252. It will be remembered that the holding circuit is not effective at this time, and consequently bar 237 drops back to lowered condition by spring 2370 before any tooth 90 arrives at pin 239. The operation progresses and at some point in the travel of slides 880 and 245, depending on the secondary aperture or apertures of the combinational punchings, the member 237 is again operated, stopping these slides with finger 247 under the desired pin 22. After the several fingers 247 and 250 are set, bar 114 is raised as in Fig. 1 and in any column where both fingers 247 and 250 are active the "0" pin and one of the other pins will be raised with consequent control of the tabulator head as is well known in the art. Thus means are provided for both numerical and alphabetical work.

To more fully understand the operation of the machine, two examples will now be given, one explaining the operation for selecting the type "e" in the first group of type and also the operation for selecting a type "r" in the second group of type.

For the selection of the type "e" for the upper line of data, the record card shown in Fig. 3 is provided with holes at the "1" and "2" index point positions and from Fig. 1, it will be seen that this will cause the elevation of the contactor bars 309 and 310. When the series of contact carrier plates 300 to 305 is moved in the arrow direction shown in Fig. 2, the contact fingers in the zones H, I, J, K, L, and M will be correlated with the contactor bars 311, 310, 309, 308, 307 and 306 respectively. The contactor bar 311 is ineffective in the selection of the type in first group. The raised contactor bars 309 and 310 and the unraised contactor bars 311, 308, 307, 306 will close a circuit by means of their brushes 204 and 205 through their correlation with the contact fingers of the contact plates to thereby close a circuit to a print control magnet 230 at a predetermined point in the cycle of machine operation. This circuit is outlined in Fig. 2 by the line designated *e—e* and is described as follows: from the brush 213, (Fig. 2), contact plate 305, contact finger 216_i of the contact plate 305, lower contactor brush 205 of the raised contactor bar 310, the contact finger 216_i of the contact plate 304, contact plate 304, contact finger 215_m engaged by the upper contactor brush 204 of the unraised contactor bar 306, contactor bar 306, contact finger 215_m of the contact plate 303, contact plate 303, contact point 215_i of the contact plate 303, upper contactor brush 204 of the unraised contactor bar 307, contact finger 215_i of the contact plate 302, contact plate 302, the contactor brush 204 of the unraised contactor bar 308, the contact finger 215_k of the contact plate 301, contact plate 301, the contact finger 216_j engaged by the lower contactor brush 205 of the raised contactor bar 309, the contact finger 216_j of the contact plate 300, contact plate 300, to the brush 214 (Fig. 5) which extends the circuit to the print control magnet 230.

As previously stated the print control magnet 230 is energized at a predetermined point in the cycle of machine operation so that the stop-lifting finger 247 will be correlated with the "2" tabulator stop of the series 22. The stop-lifting finger 247 is, as previously stated, elevated so as to raise the selected stop to thereby control the positioning of the print sector 11 to thereby select for a printing operation the type "e".

For the selection of the type "r" it will be seen from the code shown in Fig. 3 that the perforations are also provided at the index point positions "1" and "2" as for the selection of the type "e" and, furthermore, a supplemental perforation is provided at the "3" index point position. This will, as shown in Fig. 1, cause the elevation of the contactor bar 311 to thereby cause the raising of the lower contactor brush 205 from the position shown in Fig. 8. The latter, as will be seen from Fig. 2, will bridge the contact fingers 216_x to thereby close a circuit across plates 300 and 305 which, as previously stated, will cause the initial or first energization of the magnet 230 to cause the subsequent raising of the zero stop 22. As previously described, this will permit a relative positioning between the print sector 11 and the control sector 12 so that the second group of type carried by the print sector 11 is selected for operation.

The selection of the particular type in the second group is effected in the same manner as described for the selection of the type "e" so that the type "r" is selected for printing operation.

The circuits for the selection of the other type in both groups is effected in a similar manner and it is thought, therefore, that further description is unnecessary. In all cases the contact fingers are so arranged as to effect the selection of the type carried by the print sector 13.

While I have described what I consider to be the most desirable embodiment of my invention, it is obvious that many changes could be made without departing from the spirit of my invention, and I, therefore, do not limit myself to the exact construction shown nor to anything less than the whole of my invention as hereinbefore described, and as hereinafter claimed.

I claim:

1. In a machine of the class described the combination of a plurality of tabulator stops, a member operatively associated with one of said stops for effecting setting of the same, a member operatively associated with any one of the remaining plurality of said stops for effecting setting of the same common operating means for both of said members, and means operable in response to record perforations for controlling said common operating means.

2. In a machine of the class described the combination of a plurality of tabulator stops, a member operatively associated with one of said stops for effecting setting of the same, a member operatively associated with any one of the remaining plurality of said stops for effecting setting of the same, a magnet operatively associated with both of said members, and means operable in response to record perforations for operating said magnet.

3. In a machine of the class described the combination of a plurality of tabulator stops, a member operatively associated with one of said stops for effecting setting of the same, a member operatively associated with any one of the remaining plurality of said stops for effecting setting of the same, a magnet operatively associated with both of said members, means operable in response to record perforations for operating said magnet, and means for maintaining said magnet in controlling condition after said last-named means has ceased to function relatively to said magnet.

4. In a device of the class described the combination of a plurality of tabulator stops, a slide formed with a stop-operating element and movable relatively to said stops, a stop member for controlling the movement of said slide, and a secondary slide operable with the first said slide and also formed with a stop operating element.

5. In a machine of the class described, means operable in response to the analysis of combinational designations representing alphabet data, a member carrying a plurality of alphabet type, tabulator stops controlling said member, means for selecting said tabulator stops, means under control of said first named means for converting said combinational designations to a single reading, and means for operating said converting means and said selecting means in synchronous timed relationship for causing said converting means to concomitantly operate in accordance with the single reading.

6. The combination with a plurality of alphabet tabulator stops including a special type group selecting stop, means for selecting a desired stop, means for selecting said special stop, means responsive to the analysis of combinational designations, means under control of said last named means for converting said combinational designation to a single reading to cause the first named selecting means to select a desired stop, means for operating said converting means and said selecting means in synchronous timed relationship for causing said converting means to concomitantly operate in accordance with the single reading said selecting means to select a desired stop, and means responsive to the sensing of a special designation for causing the operation of said other selecting means to select said special stop.

7. In a machine of the class described, in combination, means responsive to the analysis of combinational designations representing alphabet type and a special designation for selecting a particular group of type, a plurality of printing controlling tabulator stops, means comprising a magnet for selecting said stops for selecting a particular type of a selected group, means under control of said first named means for translating said combinational designations for converting the combinational designation to a single electrical impulse for causing said magnet to select one of said stops, and electrical means operable in response to said special designation for effecting another energization of said magnet for selecting one of said stops to select a particular group of type.

8. In a Powers type tabulator, a plurality of printing controlling tabulator stops including a type group selecting stop, means responsive to the mechanical analysis of type representing designations on a record while the latter is stationary, a magnet for selecting for operation said tabulator stops, electrical means controlled by said first named means for energizing said magnet to select a tabulator stop in accordance with the designations analyzed, and other electrical means for causing another energization of said magnet for selecting said type group selecting stop in response to a special designation of said record.

9. In a Powers alphabet type tabulator which is provided with a print sector, a control sector and a type group selecting latch intermediate said sectors, the combination of a plurality of printing controlling tabulator stops including a latch operating type group selecting stop, means responsive to the mechanical analysis of type representing designations on a record while the latter is stationary, means comprising a magnet for selecting for operation said first named stops, electrical means controlled by said first named means for energizing said magnet to select a tabulator stop in accordance with the designations analyzed, and other electrical means for causing another energization of said magnet for causing the operation of said latch operating type group selecting stop in response to a certain designation of said record.

10. In a Powers type tabulator, a row of printing controlling type selecting tabulator stops including in said row a type group selecting stop, mechanical means responsive to the analysis of combinational designations representing alphabet type and a special designation for selecting a particular group of type, means comprising a single magnetically controlled means for selecting said type selecting tabulator stops, electrical means under control of said mechanical means responsive to the analysis of combinational designations for converting the mechanical representation of the combinational designations to a single electrical impulse to effect the operation of said magnetically controlled means to select a type selecting tabulator stop, and electrical means controlled by the mechanical means responsive to the analysis of said special designation for effecting the actuation of said type group selecting tabulator stop to select a particular group of type.

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