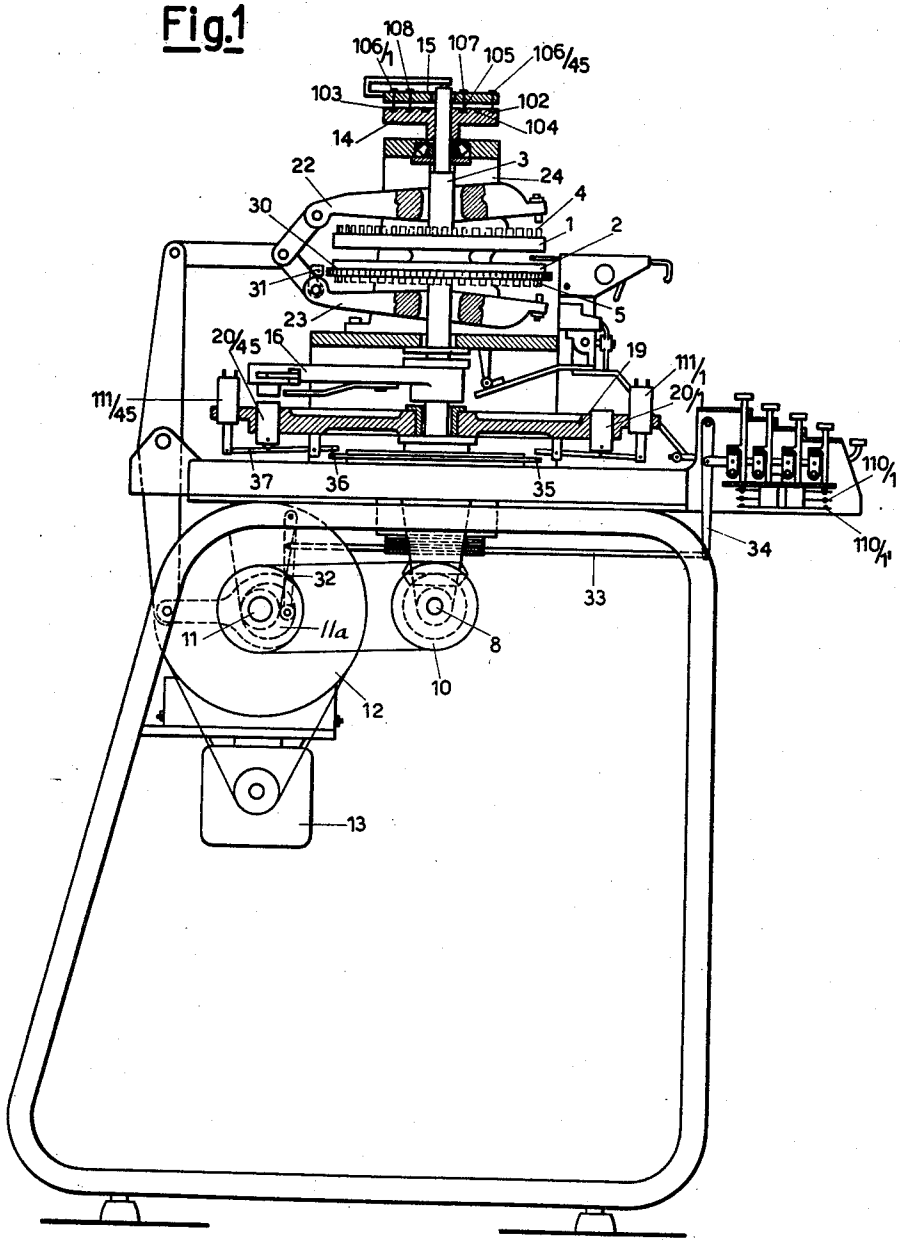
March 8, 1960 O. ABBONDANZA 2,927,676

ROTARY KEYBOARD PUNCHING MACHINE

Filed Sept. 17, 1957 8 Sheets-Sheet 1

Fig.1



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ROTARY KEYBOARD PUNCHING MACHINE

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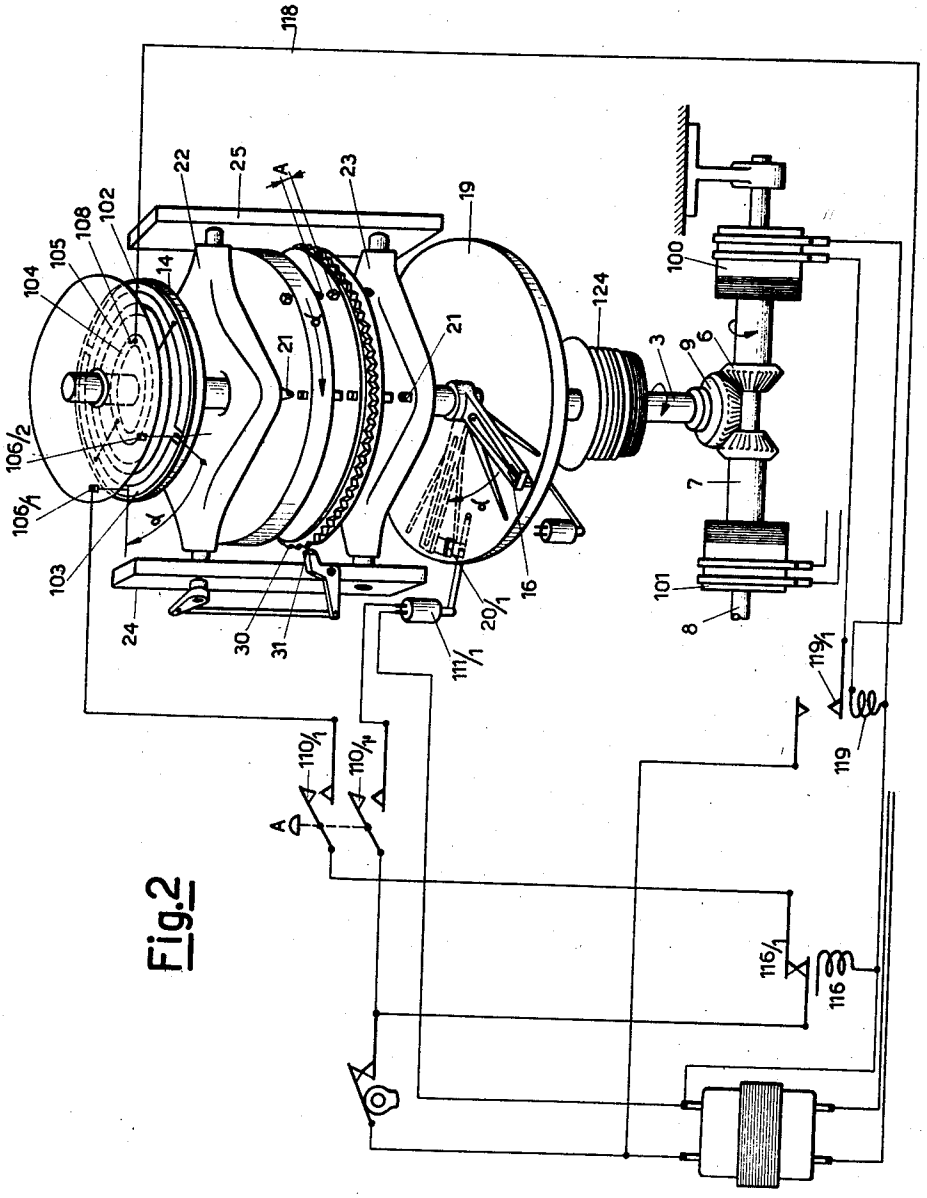


Fig. 2

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ROTARY KEYBOARD PUNCHING MACHINE

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Fig.3a

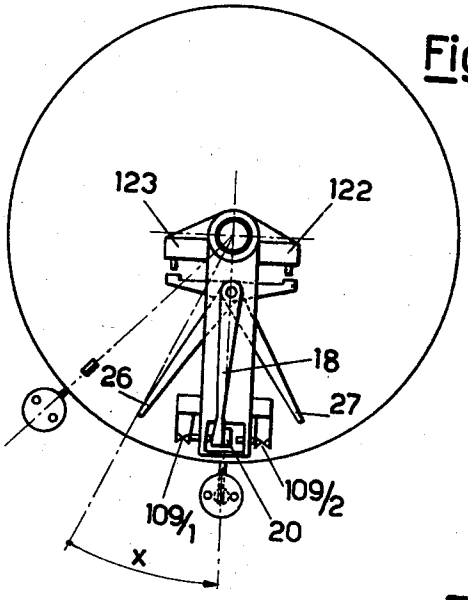
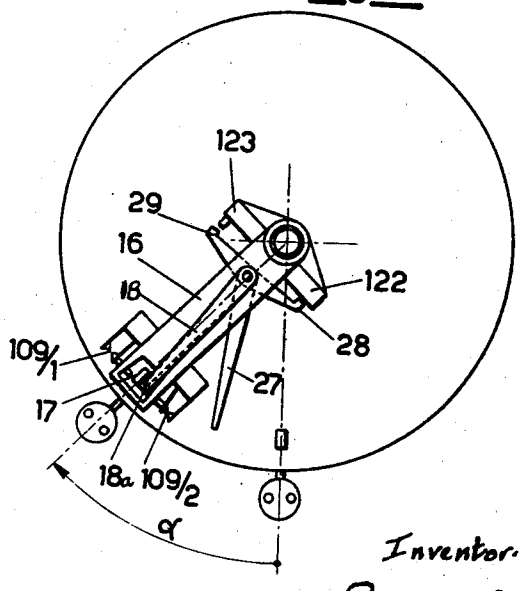


Fig.3b



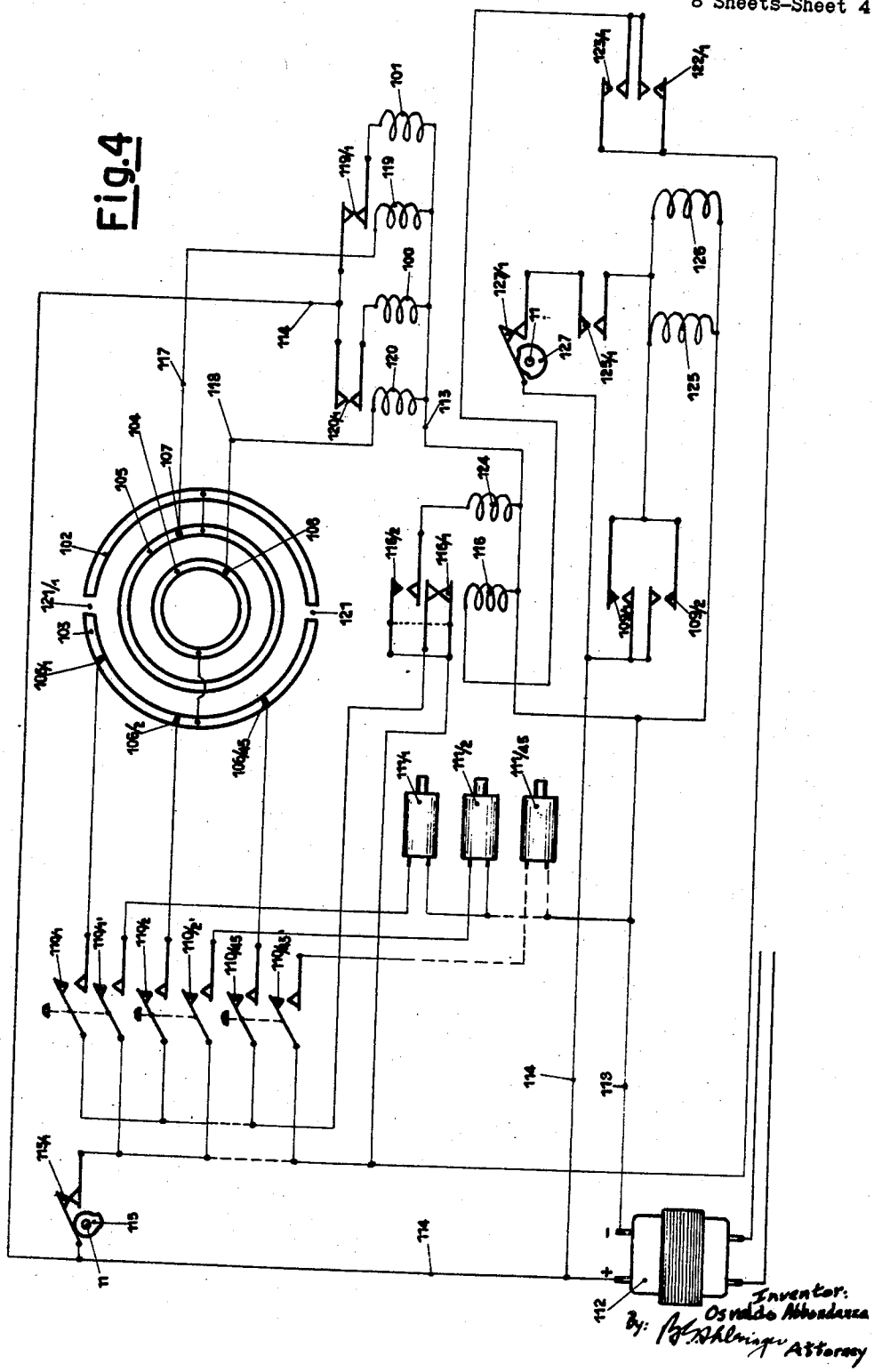
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ROTARY KEYBOARD PUNCHING MACHINE

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Fig.4



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ROTARY KEYBOARD PUNCHING MACHINE

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Fig.6

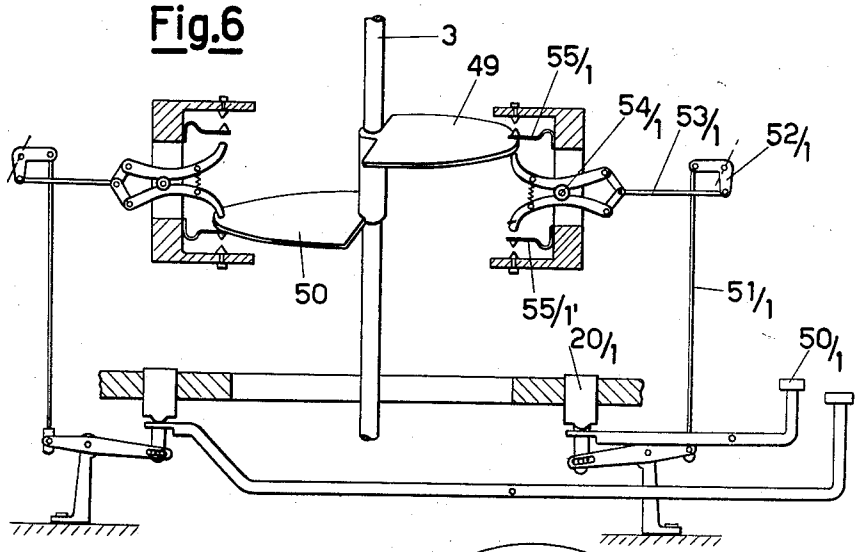
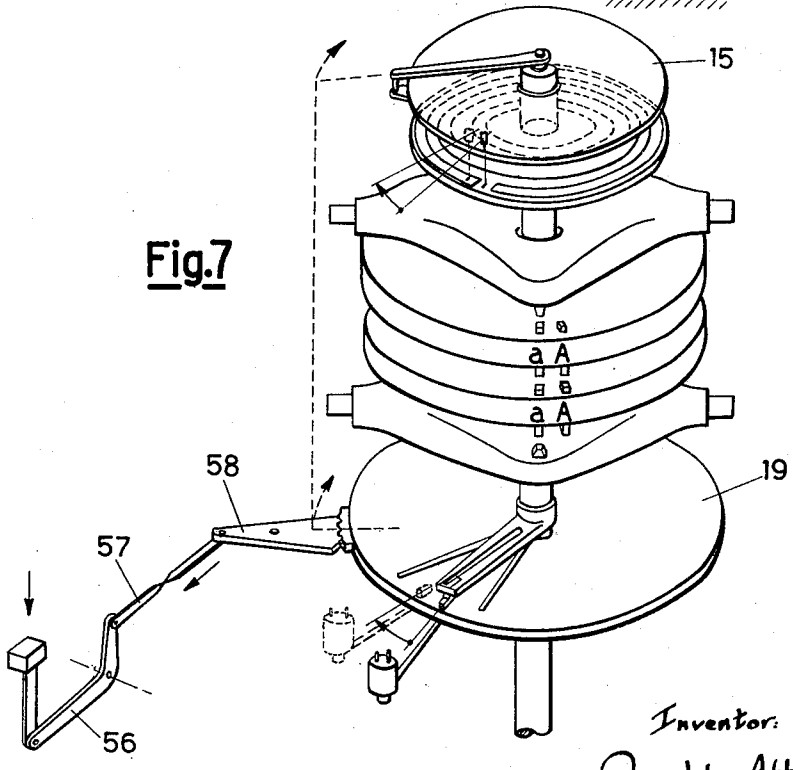


Fig.7



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March 8, 1960 O. ABBONDANZA 2,927,676

ROTARY KEYBOARD PUNCHING MACHINE

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Fig.3c

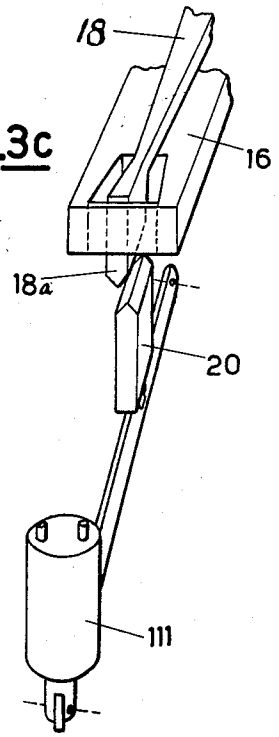
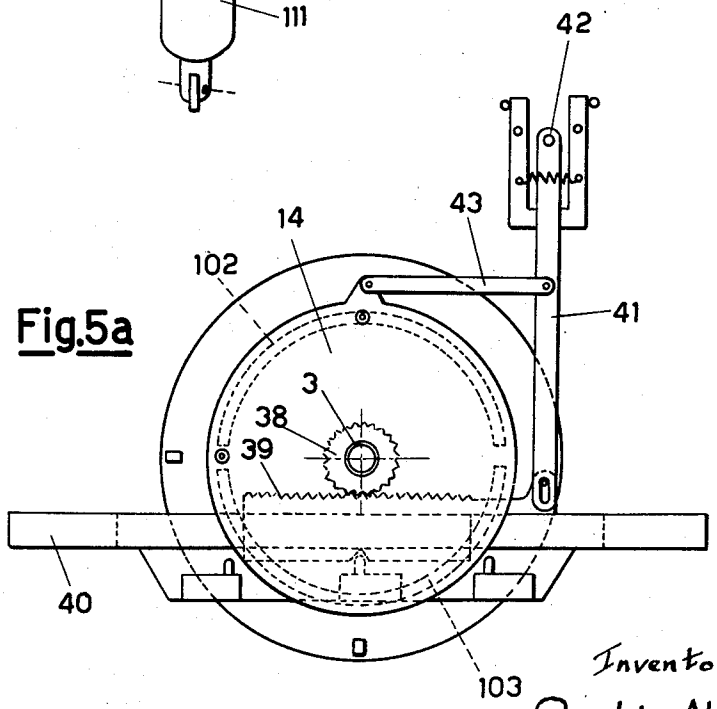


Fig.5a



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ROTARY KEYBOARD PUNCHING MACHINE

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Fig.5b

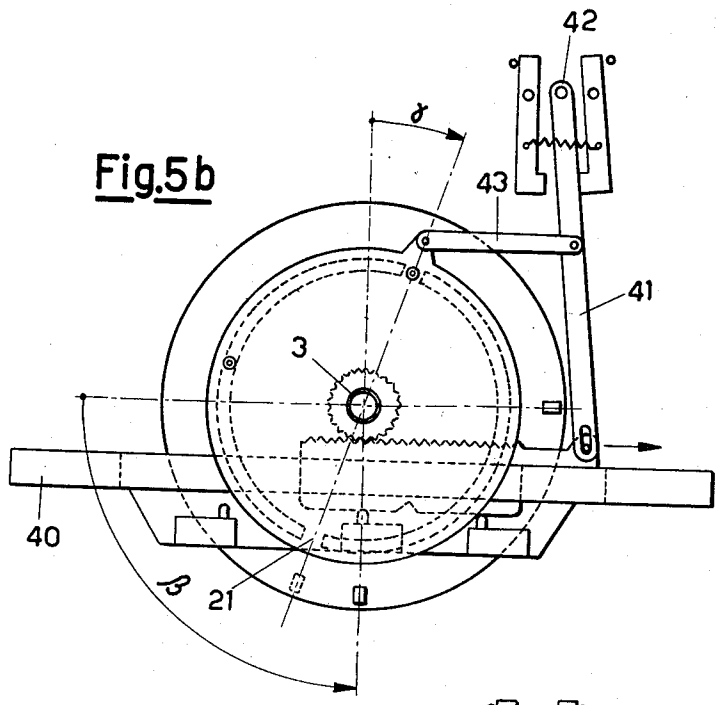
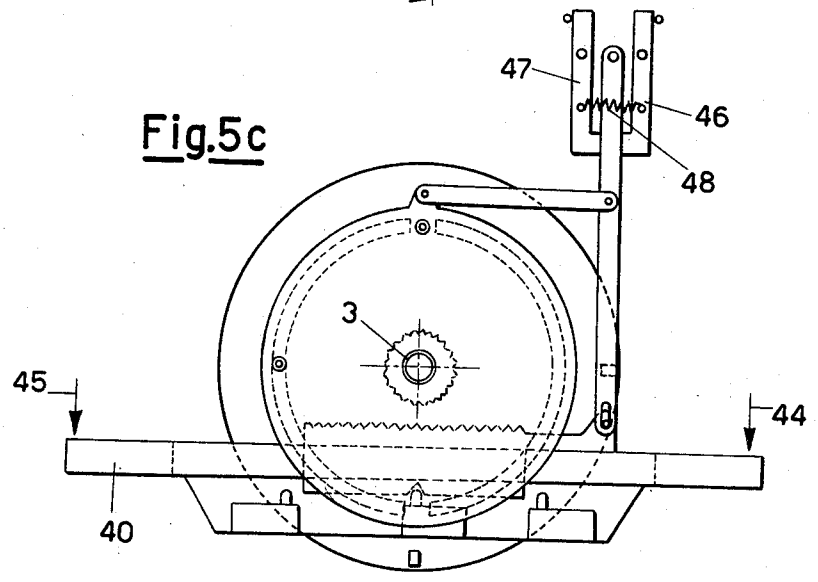


Fig.5c



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ROTARY KEYBOARD PUNCHING MACHINE

Filed Sept. 17, 1957 8 Sheets-Sheet 8

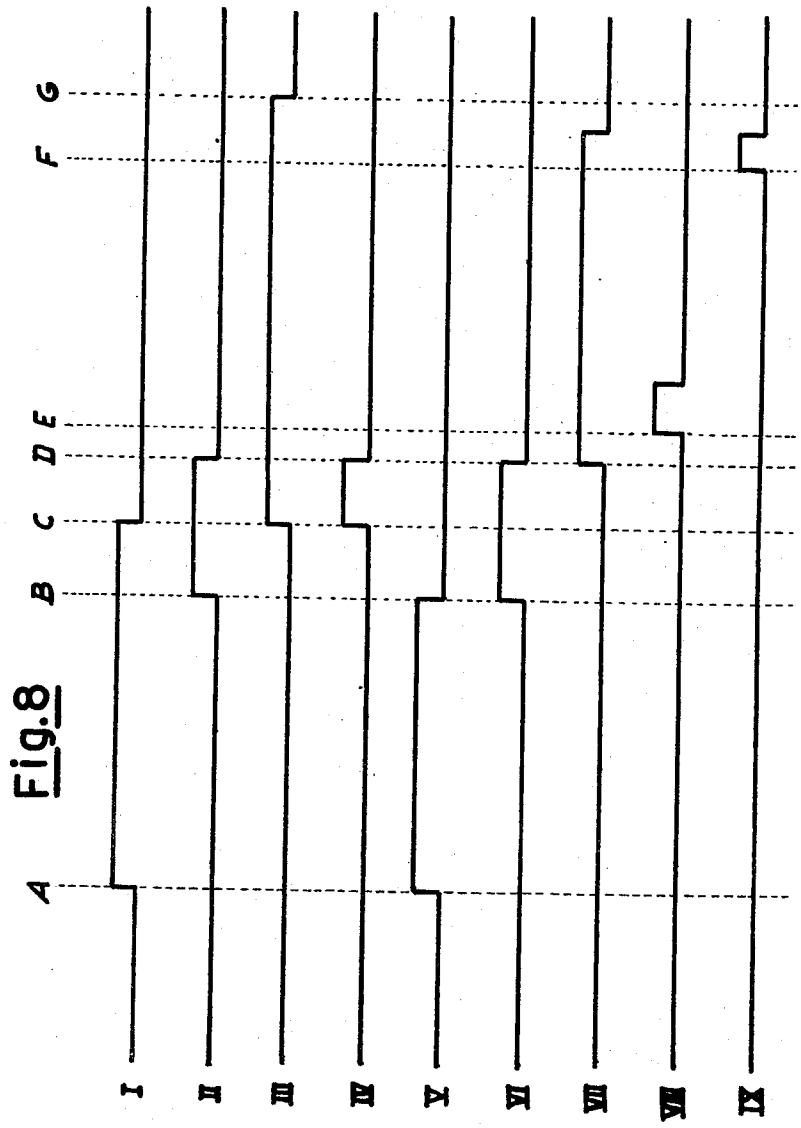


Fig. 8

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United States Patent Office 2,927,676
Patented Mar. 8, 1960

2,927,676

ROTARY KEYBOARD PUNCHING MACHINE

Osvaldo Abbondanza, Milan, Italy, assignor to Fabbrica Italiana Macchine Aziendali, Milan, Italy, an Italian company

Application September 17, 1957, Serial No. 684,477

Claims priority, application Italy October 24, 1956

9 Claims. (Cl. 197—6.6)

There are known rotary punching machines capable of engraving data in metal plaques adapted for use as visible and indelible marks for a machine or a packaged material or as matrices for the printing of the data thus punched.

There are at least two categories of such rotary machines, of which in the first one the cooperating punches wanted are brought into punching position by means of a handwheel, whereupon the control for punching proper is actuated, while in the second category the control for the positioning of the punches is effected by means of a keyboard of the kind of a typewriter keyboard, the punching taking place automatically on completion of the positioning operation.

In the types of keyboard punching machines known heretofore, the punch-carrying mechanism, represented generally by two drums, on one of which the male punches are carried and on the other of which the female punches are carried, always turns in one direction until an abutment, controlled by the keyboard, meets a stopping arm turning together with the drums. The taking place of the meeting of the arm with the abutment automatically determines the punching.

In hand-controlled machines, controlled by means of a handwheel, the operator, knowing the progression of the letters, brings the wanted letter into punching position by turning the handwheel in one direction or in the other direction, of course selecting always the direction of rotation corresponding to the smaller angle.

It is the main object of the present invention to provide a rotary punching machine with keyboard control wherein the punch-carrying drums are turned automatically in the more convenient direction of rotation for every letter that is to be punched.

It is another object of the invention to provide the machine with such a braking system as to enable a soft meeting between the arm turning with the drums and the abutments controlled by the different keys.

In Fig. 1 there is shown diagrammatically a longitudinal section of the machine.

In Fig. 2 there is shown the system for determining the more convenient direction of rotation.

In Figures 3*a* and 3*b* there are shown two positions of the stopping arm and of the associated controls, and in Fig. 3*c* there is shown a detail.

In Fig. 4 there is shown the electric circuit of the machine.

In Figures 5*a*, 5*b* and 5*c* there are shown three operating stages of the system of variable advance in the de-energizing of the rotating clutch and in the brake control.

In Fig. 6 there is shown a second possibility of control of the more convenient sense of rotation.

In Fig. 7 there is shown the control for capital letters.

In Fig. 8 there are shown the stages of the various operations which occur in every cycle of the machine.

The machine (Fig. 1) is constituted fundamentally by two punch-carrying drums **1** and **2** fitted onto the main shaft **3**. At the periphery of the drums, within special seatings, there are accommodated the male punches **4** in the upper drum and the female punches **5** in the lower drum, or vice versa.

In the case illustrated it is assumed that the machine is equipped with 90 pairs of punches corresponding to the letters of the alphabet, capital and small, to the series of numerals, capital and small, and to the different punctuation marks and characteristic symbols.

The shaft **3** is controlled by a rotation reverser which may be built according to any of the known principles.

In the case illustrated, a type with two bevel gears **6** and **7** (Fig. 2) has been selected, which are loose on the secondary shaft **8**, and which are always coupled with the bevel gear **9**, which is fitted onto the main shaft **3**. The hubs of the gears **6** and **7** are coupled with the discs of the solenoid-operated clutches **100** and **101** respectively.

With the gear **6** there is associated the clutch **100** which controls the rotation in clockwise sense of the drums; and with the gear **7** there is associated the clutch **101** which controls the counterclockwise rotation of the drums.

The control part of each clutch is fitted onto the shaft **8** which is connected by means of a pulley **10** and belt to the shaft for controlling the punch-operating shaft **11**, which in turn is connected by means of another pulley **12** and another belt to the motor **13** of the machine.

Onto the shaft of the drums there is fitted a disc of material **14** whereon there are built up two conductive half-rings **102** and **103** and two entire rings **104** and **105**.

Upon that disc, fixed to the structure of the machine, there is a brush-carrying disc **15** wherein there are, in a rim of radius equal to that of the half-rings **102** and **103**, as many brushes **106/1**, **106/2** . . . **106/45** as there are keys in the machine (with the only limitation that this number should be odd for reasons which are set forth hereinafter—in the case of 90 pairs of punches there will be 45 keys and each key will serve to control a small letter punch and another punch for a capital letter).

In correspondence with the two whole rings, on the same disc **15**, there are two further brushes **107** and **108** to which is connected the circuit for controlling the clockwise clutch **100** and counterclockwise clutch **101** respectively.

On the shaft of the drums there is fitted the stopping arm **16**, the middle line of which corresponds to the angular direction of the middle line of the insulating space **121** between the half-rings **102** and **103** indicated above.

Near the free end of the arm **16** there is provided a hole **17** within which there can move the end **18***a* of the lever **18** fulcrumed on the stopping arm **16**. The displacement of the lever **18** towards the right or towards the left (Fig. 3) determines respectively the closing of the contact **109/2** or **109/1**.

Under the stopping arm **16** there is a drum **19** at the periphery whereof there are provided recesses within which the stops **20/1** . . . **20/45** slide in a vertical direction. For every key there is such a stop, the lifting of which is determined by the lowering of said key.

That movement can be obtained by means of a rod connected to the key or, in the case of the appended illus-

tration, by the energizing of a solenoid illustrated in Fig. 1 with numerals from **111/1** to **111/45**. The energizing of the solenoid takes place by means of the closing of one of the contacts **110/1'**, . . . , **110/45'** placed under each lever of said keys.

The stops **20/1**, . . . , **20/45** are placed in an angular position which accurately corresponds to the brushes **106/1**, . . . , **106/45**. The two assemblies constitute thus two reference systems, one a mechanical one and the other one an electrical one. The lubber's line of the two systems is represented by the middle line of the recess **17** provided in the stopping arm **16** and by the middle line **121** between the two semi-rings **102** and **103**, as indicated hereinbefore.

The two lubber's lines have the same angular position so that when the stopping arm **16** is in contact with the selected stop **20**, the insulating space finds itself in correspondence with the corresponding brush **106**.

From Fig. 4, which illustrates the electric circuit of the machine, it will be noted how under the keys, in addition to the series of contacts **110/1**, . . . , **110/45**, there is the other series **110/1'**, . . . , **110/45'**. The closing of one of the contacts **110/1'**, . . . , **110/45'** determines the energizing of one of the solenoids **111/1**, . . . , **111/45**, to which corresponds the lifting of one of the abutments **20/1**, . . . , **20/45**.

The closing of one of the contacts **110/1**, . . . , **110/45** applies voltage to the brushes **106/1**, . . . , **106/45**, while the common conductor thereof is connected to the generator **112** through contact **115/1**, actuated by a cam **115** connected with the punching shaft **11** (illustrated hereinafter), contact **116/1** closed at rest, actuated by the relay **116**, and conductor **114**.

The brushes **106/1**, . . . , **106/45** are in contact with the half-ring **102** or **103**. The half-rings are connected to the entire rings **104** and **105** which are connected by way of brushes **107** and **108** and conductors **117** and **118** to the relays **119** and **120** respectively.

The common conductor of these relays is connected, by way of the conductor **113**, to the negative end of the generator. In that way, by pressing a key relative to any letter (see Fig. 2), for instance the one indicated with A, the contacts **110/1** and **110/1'** are closed. The closing of the contact **110/1'** determines, as seen, the lifting of the stop **20/1**. The closing of the contact **110/1** applies voltage—owing to the contacts **115/1** and **116/1** being closed—to the brush **106/1** from which the voltage is transmitted to the half-ring **103** and, therefore, to the associated ring **104** and, through the brush **108** and conductor **118**, to the relay **120** which thus becomes energized. To said energizing there corresponds the closing of the contact **120/1** and, therefore, the energizing of the coil of the solenoid operated clutch **100**. The shaft of the drums will then turn in a clockwise direction as long as the relay **120** remains energized. If voltage were supplied to said relay without passing over the contact **116/1**, the clutch **100** would become energized until the rotation of the half-ring **103** fixed to the disc **14** fitted onto the drum shaft, brings the insulating section **121** between the two half-rings under the brush **106/1**, that is, after covering the angle α (Fig. 3). At that time the pair of punches male and female, relative to the letter A, would have arrived at punching position, after the clockwise rotation which in the case of the scheme, is the one to which the smallest angle corresponds, namely the very angle α mentioned above. The evidence of the choice of the shortest way for bringing the punch A to punching position, results from the perspective view of Fig. 2. As already seen, the stops **20/1**, **20/2**, . . . , **20/45** and the brushes **106/1**, . . . , **106/45** are arranged respectively in the same angular position and in fixed position, while on the rotary part there are connected the respective lubber's lines **16** and **121** together with the punches arranged in radial alignment with their respective stops and brushes.

In that way the angle α by which the lubber's line **16** will have to rotate to come into contact with the stop, will be the same angle by which the punch A is distant from the punching position. Hence the punching takes place when the arm is in contact with the stop and the middle line of the insulating space **121** is below the brush **106/1** and the punch A is under the punching hammers **21**.

From what has been set forth hereinbefore it will appear clearly how the number of the keys and brushes **106** must be an odd number. In fact, at the end of every search, the brush of the controlled key comes to find itself in the insulating interspace **121**, so that of the other brushes one-half will be in contact with the half-ring **102** and the other half with the half-ring **103**, while none will be in contact with the other insulating interspace **121/1**. This condition is satisfied by an odd number of brushes: in the illustrated case, the brushes are forty-five, of which one is in contact with the insulating space **121**, while twenty two are in contact with the half-ring **102** and other twenty two are in contact with the half-ring **103**. The dimensions of the insulating space **121** in the case illustrated will have to be subtended by an angle smaller than $\frac{1}{45}$ of 360°.

From that arrangement it will now appear clearly how the unit is always in a position to take any punch to punching position according to an angle of rotation smaller than 180° and how that angle will always be the smaller one that exists between any punch and the punching position.

The punching hammers **21** are carried by two jaws **22** and **23** fulcrumed on the shoulders **24** and **25** of the machine and controlled by means of various lever systems known per se, by an eccentric **11***a* controlled by the punching shaft **11**.

To explain the search of direction, it has been assumed here that the clutch **100** is energized until the arrival of the brush **106** in correspondence with the insulating space **121**. This would not be convenient in practice, since under that condition, the unit, having a rather considerable kinetic energy, would strike violently against the abutment by means of the rotary arm. Reduction of that energy is provided, according to one first embodiment, by an advancing and braking system illustrated in Fig. 3.

Displaced with respect to the reference line by a certain angle X (to be determined in relationship with the moment of inertia of the system, with the time of energizing of the selected brake, with the braking couple thereof and with other considerations), there are the two small levers **26** and **27** which by means of an elastic connection with the levers **28** and **29** come into contact with the plunger of one or the other of two quick breakers **122** and **123** whose contacts **122/1** and **123/1** are normally open.

If, again according to the preceding example, the drum has to perform a clockwise rotation of α degrees, to take the punch A to the punching position, before the stopping arm comes into contact with the abutment **20/1**, the small lever **27** advances the arrival at said abutment by an angle X thus closing the contact **122/1** which in turn energizes the relay **116**. The energizing of said relay has the following consequences:

(*a*) The contact **116/1** of the relay **116** is opened whereby voltage is taken from the common one of the contacts **110/1**, . . ., **110/45** and, therefore, from the direction relay **119** (or **120**). The de-energizing of the relays **119** and **120** has the effect of disconnecting the clutch **100** or **101** from the drive shaft **8**.

(*b*) The contact **116/2** is closed, whereby from the contact **115/1** normally closed there arrives voltage to the coil of the electromagnetic brake **124**, whose rotary part is fitted onto the axis of the drum **1**. Said brake may even be of another kind, provided it can be controlled by a solenoid. In that way the rotary masses associated with the punch-carrying drums are disconnected from the drive and braking shaft prior to the occurrence of the

impact between the abutment and the stopping arm. When said impact takes place, the small arm **18** closes the contact **109/1** or **109/2** according to the direction of rotation, thereby energizing the relay **125** and the clutch **126** for initiating the punching.

From the positive pole of the generator, by way of normally closed contact **127/1** and contact **125/1**, closed when the relay is energized, there is kept the voltage for the punching clutch **126**. The rotation of the punching shaft **11**, if put in rotation by the clutch **126**, in addition to determining the compression of the punches as mentioned hereinbefore, rotates the cams **115** and **127** cited above, as well as the eccentric **11***a* on which there depends the control of the small tooth for centering the drums **31**. This tooth engages on the toothed rim **30** built up on the periphery of the drum **2** and which has as many teeth as there are punches **4**. If said small tooth has begun engaging the tooth relative to the desired punch, the cam **115** opens the contact **115/1**. Said opening determines:

De-energizing of the solenoid for controlling the abutment previously energized with consequent lowering of the abutment and opening of the contacts **109/1** or **109/2** (the relay **125** being however self-energized, remains in active position).

De-energizing of the brake solenoid **124**. This permits the small positioning tooth **31** to correct the position of the drum which is no longer braked, so as to have an accurate position of the punching of the letter. All the circuits thus return to their rest conditions, except the punching circuit.

In the same stage in which the contact **115/1** opens, the keyboard is released, by way of lever systems **32**, **33**, **34**, so permitting the operator to depress the subsequent key desired, even before termination of the punching.

A disc **35** is lifted thus acting upon the ends **36** of the small levers **37** actuated by the solenoids **111**, so as to ensure the lowering of the abutments **20** the solenoids **111** of which are already de-energized, as said above.

Towards the end of punching the cam **127** opens the contact **127/1** thereby de-energizing the relay **125** and the clutch **126**.

The inertia of the masses associated with the shaft **11** (which is rather small) is annulled by the considerable passive resistance and by a small mechanical brake not shown in the drawings.

In Figures 3*a* and 3*b* there are visible the positions of the small arm **18**, of the contacts **109**, of the breakers **122** and **123** and of the abutment **20** at rest and in action. In Fig. 3*a* all the members are at rest prior to the occurrence of the rotation through the angle α, to take the punch A to the punching position. The contacts **109/1** and **109/2** are open and the breakers **122** and **123** are not actuated. Within the recess **17** there is visible the abutment **20** with which the stopping arm had come into contact in the previous search. In Fig. 3*b*, after a clockwise rotation by the angle α, the small arm **18** has performed the stroke admissible for it within the recess **17** following the impact against the abutment **20** relative to the letter A; the contact **109/1** is closed and the breaker **123** has been actuated when, with the advance of X degrees, the small lever **26** has come into contact with the abutment **20**.

In that position the lubber's line of the arm **16** is in contact with the desired abutment.

The braking system just described brakes in a safe and accurate manner, assuming the slipping of the clutches to be negligible, that is, assuming that, for the different values of the angles of rotation, there are no obnoxious variations of angular speed. In order to take into account, instead, the possibility of such variations of angular speed for small angles, it is possible to use another system for controlling the braking relay **114** placed in parallel to the one indicated above. This second system is illustrated in Fig. 5.

Onto the main shaft **3** there is fitted a toothed pinion **38** whereon, in rest position and in the rotational stage, there engage the teeth of a rack **39** which during rotation slides longitudinally within a guide **40**.

At the end of the rack there is connected a small lever **41** fulcrumed at **42**; to that lever there is connected another small lever **43** fulcrumed in the disc **14** which carries the half-rings **102** and **103**.

Following a rotation, for instance a counterclockwise one, of the main shaft **3**, by an angle B, the rack **39** is displaced towards the right of Fig. 5*b* and, consequently, the space **121** between the half-rings **102** and **103** is rotated in clockwise sense by an angle γ. In that way the middle line will arrive at correspondence with the brush **106** urged in advance by said angle γ, with respect to the arrival of the stopping arm **16** at the abutment **20**.

Said advance is proportional to the angle of rotation by which the drums should turn (it increases with said angle), so as to introduce a variable advance to the de-energizing of the clutches for rotation control, as well as to the energizing of the brake.

If said angle γ (Fig. 5) is greater than the angle X (Fig. 3) of fixed advance of the small levers **26** and **27**, it will be the arrival of the brush **106** on the insulating section **121** which breaks the circuit of the relays for direction, **119** or **120** (Fig. 2).

If the shaft **3** will have been stopped and there will have begun (as illustrated hereinbefore) the stage of punching, a control (not shown in the drawings) connected to the compressing jaws **22** and **23** will push the guide **40** in the direction indicated by the arrows **44** and **45** (Fig. 5*c*) so as to disengage the rack **39** from the pinion **38**. In that position the small lever **41**, pushed by the small levers **46** and **47** connected to each other by the spring **48**, will make the rack **39** slide within the guide **40** to take it back to centered position with respect to the pinion. By effect of the same action, the disc **14** too will return to normal or rest position.

When on termination of compression the punching jaws **22** and **23** will lift again the small hammers **21** and **22**, the guide **40** will be taken again towards the axis and the rack **39** will engage again the pinion **38** as shown in Fig. 5*a*.

The system of selection of the minimum angle of rotation as described above, and which is of electromechanical character, may be arrived at in another manner, with prevailingly mechanical methods, as illustrated by Fig. 6.

In Fig. 6, on the shaft **3** there are fitted two half-discs **49** and **50**, each of which extends through an angle of 180°, and which are staggered axially and angularly.

The keys **50/1**, . . ., **50/45**, if actuated, lift the abutments **20/1**, . . ., **20/45** and at the same time, by means of tie rods **51/1**, . . ., **51/45**, angle levers **52/1**, . . ., **52/45** and tie rods **53/1**, . . ., **53/45**, they actuate the shears **54/1**, . . ., **54/45**. To the carrying structure of the machine there are connected the contacts **55/1**, **55/1'**, . . ., **55/45**, **55/45'**; whose upper contacts **55/1**, . . ., **55/45** close the control circuit for clockwise clutch **100**, while the lower contacts **55/1'**, . . ., **55/45'** close the control circuit for counterclockwise clutch **101**. It is thus clear how also in this case according to the position of the shaft **3** and, therefore, of the semi-discs **49** and **50**, by depressing a certain key, one determines the closing of one of the upper contacts or of one of the lower contacts, the closing of the other of the two contacts being hindered by the presence of one of the two half-discs. Also this system so solves the problem of search for the more convenient direction of rotation.

As will be noted, there is a complete analogy between this second method and the first one. For the system of the semi-rings there have been substituted two semi-discs; for the series of brushes there have been substituted two series of contacts.

It should be understood that the solution of the prob-

lem can be arrived at by utilizing part of the first system and part of the second system. For instance, it is possible to replace the solenoids for controlling the abutments, with mechanical controls and rods controlled mechanically by the keys and constituted in a manner analogous to typewriters.

The system indicated utilizes a number of keys which is half the number of punches contained in the punch-carrying drums **1** and **2**, in analogy to what is done in typewriters. To utilize each key for the control of two punches there is needed, therefore, a system for interchanging small and capital letters.

The system adopted is illustrated diagrammatically in Fig. 7. By means of an action upon the key M by means of levers **56, 57, 58**, there is determined the rotation of the punch-carrying support **19** by an angle equal to that provided between each small letter punch and its adjacent capital letter punch (*a* and A in the case of Fig. 7), so as to take the punch and solenoid from the position indicated by solid lines to that indicated by dotted lines. At the same time, also the insulating disc **15**, which contains all the brushes, is rotated by an equal angle so as to take the brush involved to the position indicated by dotted lines, that is, into contact with a half-ring.

If now it is assumed that the letter *a* was punched previously and that the capital letter key was depressed, following the rotation of the punch-carrying disc **19** and of the brush-carrying disc **15**, if the key corresponding to the letter A is pushed by way of the brush **106** and half-ring **103**, the clockwise rotation circuit for the clutch **100** will be closed and the shaft **3** will rotate in such a way as to take again the stopping arm into contact with the abutment.

Following that rotation, now the punch A will be in punching position.

Another feature of the unit appears in the case of the repetition of the punching of a letter.

As illustrated hereinbefore, if a punch has already been actuated, the brush corresponding to the letter finds itself in the insulating space between the two half-rings and the stopping arm finds itself with its reference in correspondence with the abutment actuated.

On pressing again the key corresponding to the same punch (case of double letters), the brush, finding itself in the insulating space, cannot determine the actuation of the clutch and, therefore, the shaft remains fixed. The abutment involved, however, is actuated nevertheless, and in lifting, it displaces the small arm **18** so as to close the contact **109/1** or **109/2** thus determining, as we have seen, the punching action (Fig. 3*c*).

In order that the abutment may be able to rise, said abutment has wedge-shape, and so has the lower portion **18***a* of the small arm **18**. Hence if the abutment **20** is actuated by the solenoid **111**, the small arm **18** is displaced, as said above, in such way as to close the contact for punching control.

For a complete survey of the operating stages, the diagrams of Fig. 8 are referred to.

The stage I relates to the period of rotation. The rotation begins at the time A (when the clutch is energized) and ends at the time C (when the stopping arm comes into contact with the abutment).

The stage II relates to the period of closing of the contact **122/1** or **123/1**. The time B of the beginning of closure is the time of the arrival of the small arm **26** or **27** at the abutment **20**. The difference between the times C and B represents the advance in time due to the angle X by which the small levers **26** and **27** are displaced from the line of reference.

The stage III comprises the period in which punching takes place. The starting time C corresponds to the end of rotation (closing of the contacts **109/1, 109/2**).

The stage IV relates to the closing of the contacts **109/1** or **109/2** and is the cause of the beginning of the stage III. Times C and D.

The stage V relates to the duration of the energizing of the relay **119** or **120** and of the clutch **100** or **101**. The time B in which said stage ends, corresponds to the beginning of the stage II (closing **122/1** or **123/1** by which said time is determined).

The stage VI relates to the duration of the braking and is confined by the times B and D (closing **122/1** or **123/1** and opening **115/1** as stage VII).

The stage VII above the base line reports the time in which the contact **115/1** has opened since said stage begins at the time D. It will be noted that at the end of the cycle the contact is still closed: this is a condition indispensable for the beginning of the subsequent cycle.

The stage VIII, which begins at the time E, expresses the stage in which the keyboard is released. At the end of said interval of time it is already possible to depress the subsequent key, that is, even prior to the ending of the cycle in course. This circumstance serves to accelerate the rhythm of typing.

The stage IX relates to the opening of the contact **127/1** at the time F. The period is very short and serves only to take the self-energizing away from relay **125**. At the end of the cycle of punching, this contact is closed again. From the time F till the time G there takes place the termination of punching with de-energized clutch. The movement of the shaft is due only to the forces of inertia.

Having so illustrated the principles of embodiment of a keyboard punching machine with instantaneous determination of the more convenient direction of rotation, we wish to point out that this principle may be utilized in various other applications and, to remain in the field of business machines, for instance in rotary card holders with calling of the card by means of keys. In such apparatus, the rotating panels are marked with a numeral and the desired panel is called by pressing one or more keys.

To get the search in the more convenient direction it suffices to think of connecting to the shaft for rotation of the panels, directly or by means of a transmission, an insulating disc with half-rings according to what has been set forth hereinbefore. To the individual keys (or in combination as in the case of the capital and small letters or according to more than two combinations), there will be connected a brush, while the series circuit, including the key, brush, and half-ring will end at one or the other clutch coil (or at one or the other remote control switch of a remote control reverser in the case in which the reversal of direction is more economically obtainable by means of the reversal of one phase of an alternating current motor), thus determining the rotation according to the smaller angle.

I claim:

1. A machine for printing characters on metal plates, comprising a disc having a plurality of punches peripherally arranged thereon, said disc being mounted to rotate to bring said punches selectively into punching position, a first arcuately formed sector, a second arcuately formed sector, each of said sectors having an extent of less than 180° and mounted to rotate with said disc, an angularly fixed selection member for each character mounted to be movable into and out of operative position, a keyboard having a key for each of said members, said keys being connected to the respective members to move a member into operative position upon depression of the associated key, said first sector being disposed to interfere with a group of said members, when any one of said group is moved to operative position, said second sector being disposed to interfere with another group of said members when any one of said second group is moved to operative position, a first circuit means for rotating said disc in one direction in response to the interference of a member of said first group with said first sector and a second circuit means for rotating said disc in the other direction in response to the interference of a member of said second group with said second sector to bring one

of said punches into operative position, and means to actuate each of said punches when it is in punching position.

2. A machine according to claim 1 comprising a stopping member, and an arm mounted to rotate with said disc, each of said circuit means selectively actuating said stopping member to strike against said arm.

3. A machine according to claim 2 wherein said arm is provided with an intermediate member mounted to be resiliently displaceable upon striking said stopping member, and wherein the actuating means for the punches includes a first switch and a second switch which are selectively operated by said intermediate member depending upon the direction of rotation of said disc.

4. A machine for imprinting characters on metal plates, comprising a disc having a plurality of punches peripherally arranged thereon, said disc being mounted to rotate to bring said punches selectively into a punching position, a first arcuately formed sector, a second arcuately formed sector, each of said sectors having an extent of less than 180°, an angularly fixed selection member for each character mounted to be movable into and out of operative position, a keyboard having a key for each of said selection members, said keys being connected to the respective members to move a member into operative position upon depression of the associated key, said first sector being disposed to interfere with a first group of said members when any one of said group is moved to operative position, said second sector being disposed to interfere with a second group of said members when any one of said second group is moved to operative position, said disc having an arm rotatable therewith, a stopping member, a first circuit means for rotating said disc in one direction in response to the interference of a selection member of the first group with said first sector, a second circuit means for rotating said disc in the other direction in response to the interference of a selection member of the second group with said second sector, each of said circuit means actuating said stopping member, and a switch means attached to said disc and disposed in advance of said arm in each direction of rotation, said switch means opening each of said circuit means in response to its interference with a said stopping member a predetermined distance in advance of the striking of said arm against said stopping member, thereby deenergizing the rotational means for said disc.

5. A machine according to claim 4 comprising means to actuate each of said punches when it is in punching position, and an intermediate element which initiates operation of said actuating means in response to the lifting of the stopping member when said arm is already in correspondence with said stopping member.

6. A machine for imprinting characters on metal plates, comprising a disc, said disc having a plurality of punches peripherally arranged thereon, each of said punches corresponding to a selected character to be printed, a second group of punches each being arranged peripherally on said disc and spaced a predetermined angle from each of the first-mentioned punches, said disc being mounted to rotate to bring a selected one of said first group of punches to punching position, a manual lever means, means connecting said manual lever means for rotating said disc to bring a selected one of said second group of punches to punching position upon actuation thereof, a first arcuately formed sector, a second arcuately formed sector, each of said sectors having an extent of less than 180°, an angularly fixed selection member for each character, a keyboard having a key for each of said members, said keys being connected to the respective members to move a member into operative position before depression of the associated key, said first sector being disposed to control one group of said members when any one of said group is moved to operative position, said second sector being disposed to control a second group of said members when any one of said second group is moved to operative position, a first circuit means for rotating said disc in one direction in response to the interference of a member with one sector, and a second circuit means for rotating said disc in the other direction in response to the interference of a member with said second sector.

7. A machine for imprinting characters on metal plates comprising a disc having a plurality of punches peripherally arranged thereon, said disc being mounted to rotate to bring a selected one of said punches to punching position, a second disc mounted to rotate with said first disc, a first arcuately formed conductor mounted on said second disc, a second arcuately formed conductor mounted on said second disc, each of said conductors having an extent of less than 180°, an angularly fixed contact brush for each character to be printed, each of said brushes adapted to slide against said first and second conductors during rotation, a group of brushes being in contact with said first conductor and a group of said brushes being in contact with said second conductor, a keyboard having a key for each brush, said keys electrically connecting a brush upon depression of the associated key, said first conductor being electrically connected with a first annular ring of conductive material mounted to rotate with said disc, said second conductor being electrically connected with a second annular ring of conductive material mounted to rotate with said disc, a first circuit means including said first annular ring and said first arcuately formed conductor for rotating said disc in one direction in response to the operation of a selected key, and a second circuit means including said second annular ring and said second arcuately formed conductor for rotating said disc in the other direction in response to the operation of a key.

8. A machine for imprinting characters on metal plates, comprising a disc having a plurality of punches peripherally arranged thereon, said disc being mounted to rotate to align a selected one of said punches to punching position, a first semi-circular member mounted to rotate with said disc, a second semi-circular member diametrically opposed to said first member and mounted to rotate with said disc, a plurality of peripherally disposed devices mounted to selectively correspond with said first and second semi-circular members, one of said devices being for each character to be imprinted, a keyboard having a key for each of said devices to selectively actuate its corresponding device upon the operation of its key, and circuit means including each of said devices for rotating said disc in both directions, said circuit means being effective to rotate said disc in one direction when said first semi-circular member is in correspondence with a selected device, said circuit means being effective to rotate the disc in the other direction when said second member is in correspondence with a selected device.

9. A machine for improving characters on metal plates, comprising a disc having a plurality of punches peripherally arranged thereon, said disc being mounted to rotate to align a selected one of said punches to punching position, a first arcuately formed sector, a second arcuately formed sector, each of said sectors having an extent of less than 180°, an angularly fixed selection member for each character mounted to be movable into and out of operative position, a keyboard having a key for each member, said keys being so connected to move a member into operative position upon the depression of the associated key, said first sector being disposed to control a group of said members when any one of said group is moved to operative position, said second sector being disposed to control a second group of said members when any one of said second group is moved to operative position, a first circuit means for rotating said disc in one direction through a predetermined angle in response to the interference of a selection member with one sector, a second circuit means for rotating said disc through a predetermined angle in the other direction in

response to the interference of a selection member with said second sector, an annular member mounted to rotate with said disc, and lever means connecting said first and second sector to said member, said lever means varying the angular position of said first and second sector relative to said disc depending on the distance said disc is caused to rotate.

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