Sept. 27, 1960 E. E. JENSEN 2,953,986

ELECTRICALLY CONTROLLED PRINTING APPARATUS

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Fig. 1

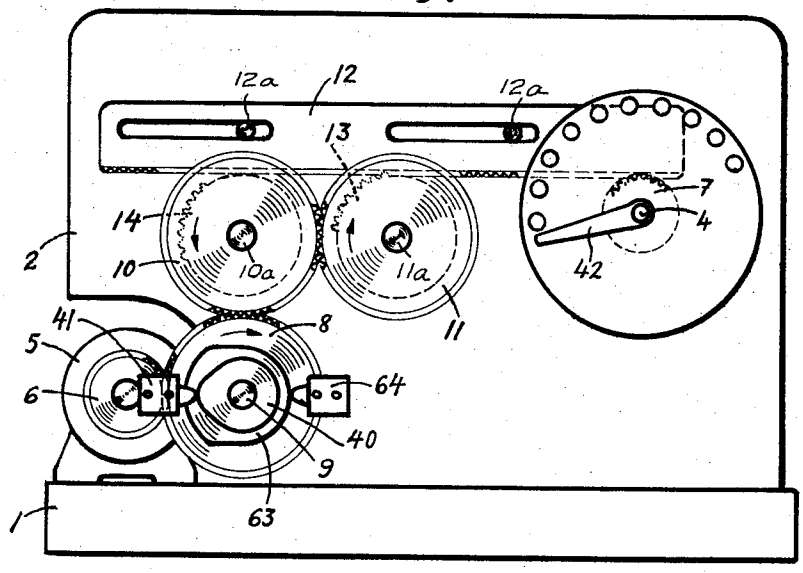
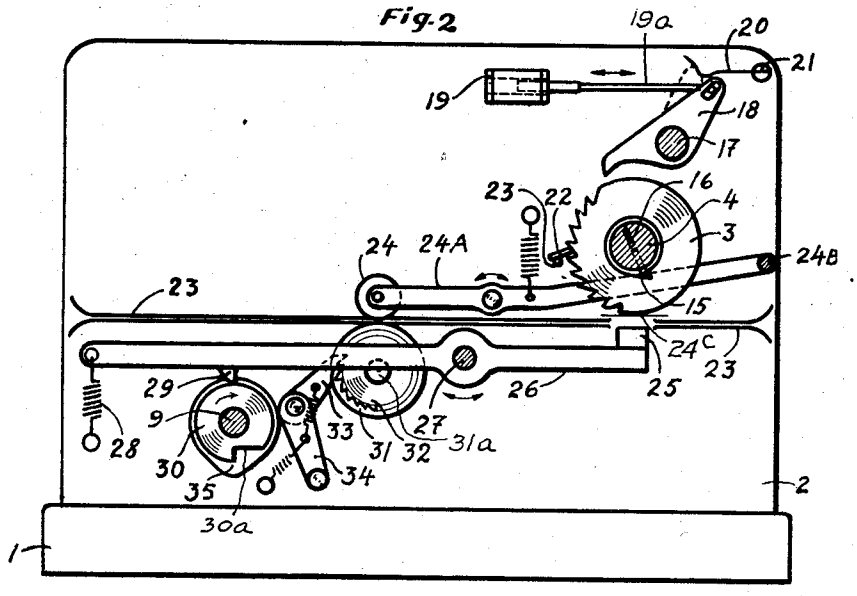


Fig. 2



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Fig.3

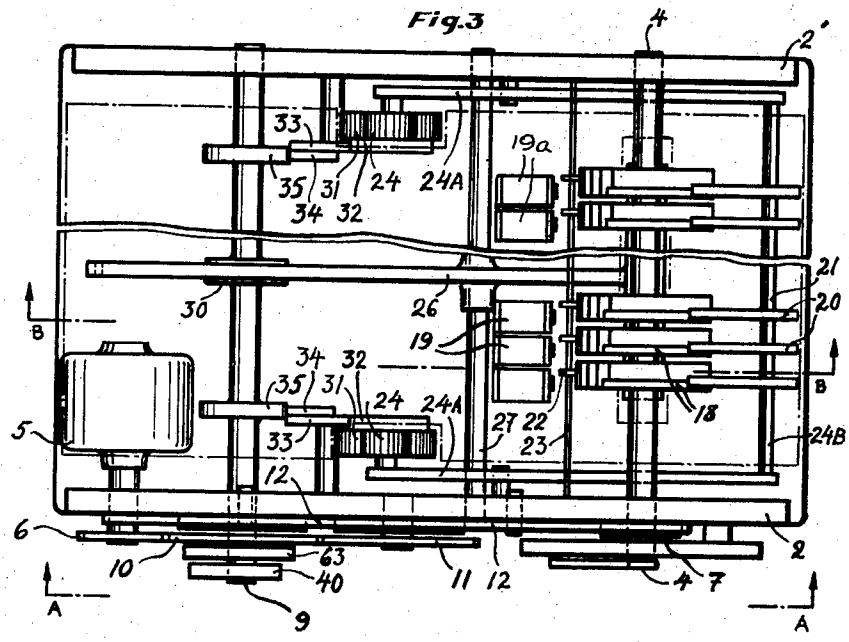
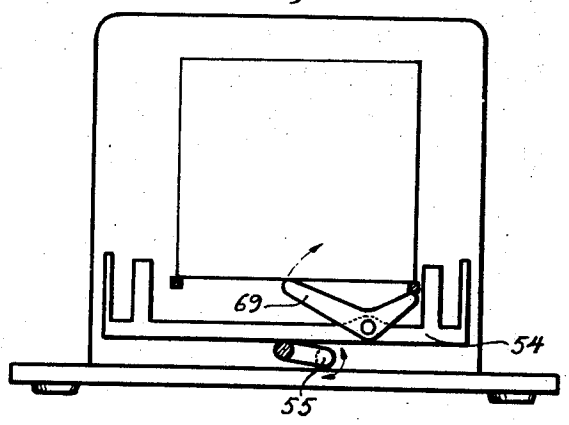


Fig.7



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ELECTRICALLY CONTROLLED PRINTING APPARATUS

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Fig.4

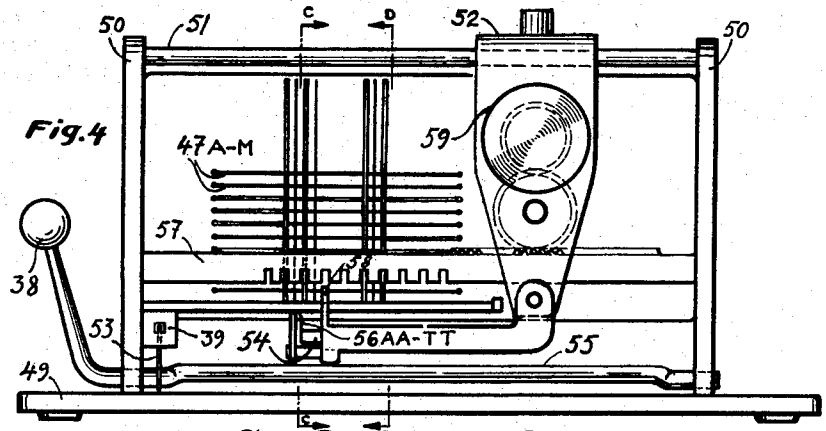


Fig.5

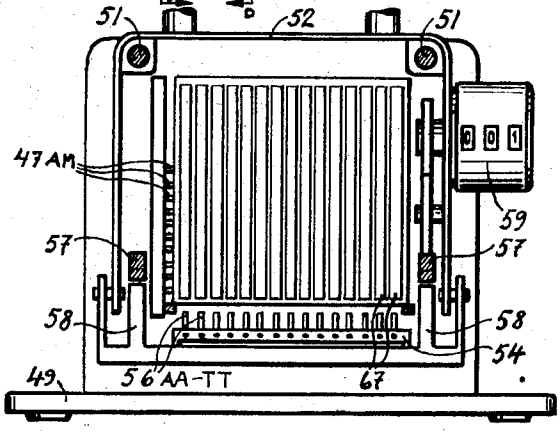
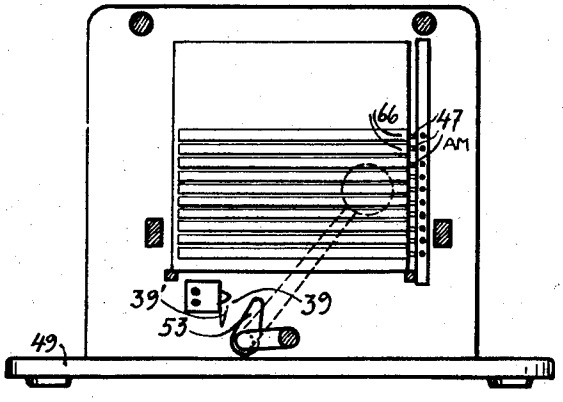


Fig.6



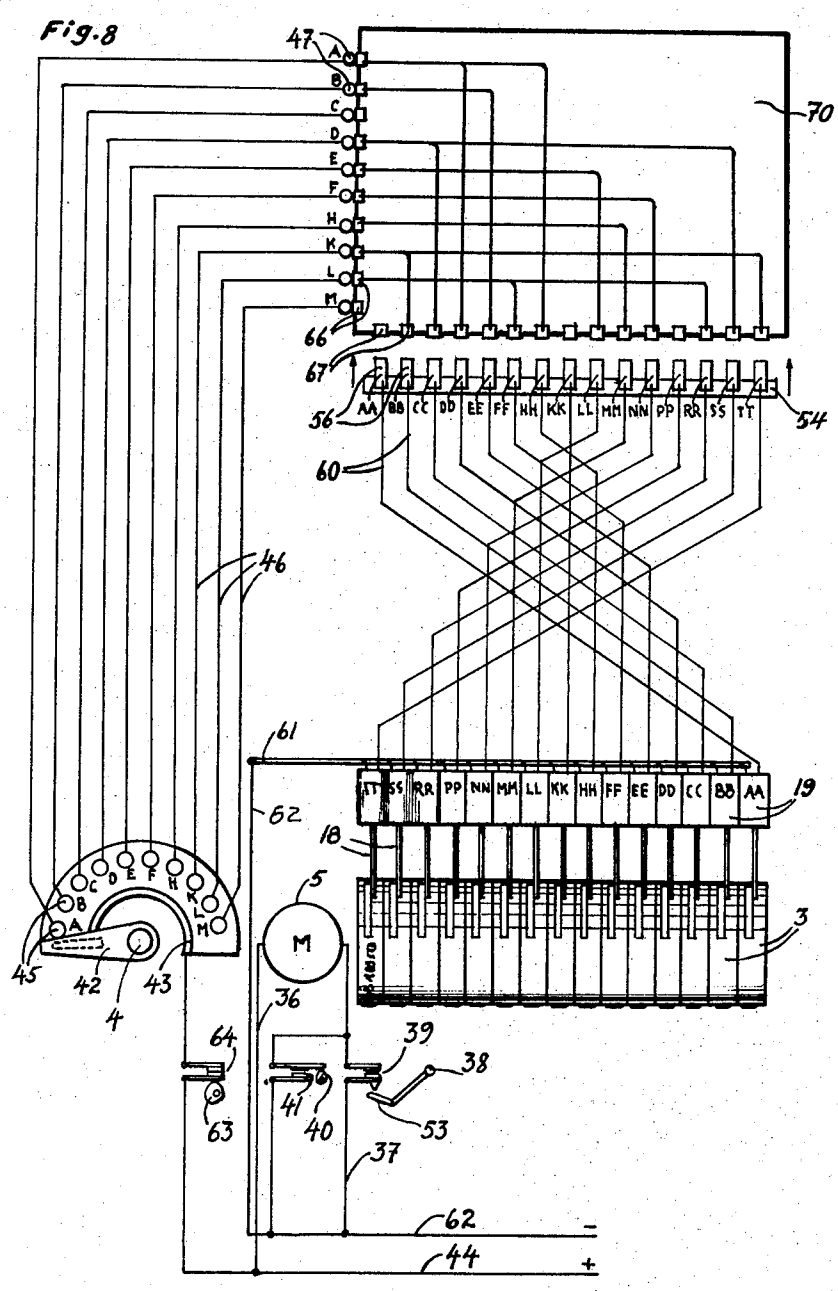
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ELECTRICALLY CONTROLLED PRINTING APPARATUS

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Fig. 8



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United States Patent Office 2,953,986 Patented Sept. 27, 1960

2,953,986

ELECTRICALLY CONTROLLED PRINTING APPARATUS

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Filed Mar. 31, 1958, Ser. No. 725,016

Claims priority, application Sweden Mar. 30, 1957

9 Claims. (Cl. 101—93)

This invention relates to an electrically controlled printing apparatus comprising a plurality of movably arranged type elements provided with printing characters, said elements being advanced synchronously by a common driving device until the type characters of the respective elements intended for printing have reached printing position where the feeding of each type element is stopped by a stop member associated with the respective printing element and controlled by electric control devices, whereafter the printing takes place.

The main object of the invention is to provide an improved printing apparatus of the kind indicated above, which at the same time prints all printing characters of a type line of practically arbitrary length.

Another object of the invention is to obtain a printing apparatus which is particularly suitable for printing invoices and the like.

The printing apparatus according to the invention is substantially characterized in that the circuitry connecting the electrical control device with the source of current comprises firstly one coupling member selected from a plurality of coupling members prepared in advance in accordance with information items intended for printing, said coupling members being assembled in a selecting device, provided with two sets of contacts, and conductively connecting contacts in the first set with contacts in the other set in conductive combinations characteristic for the selected coupling member, secondly, a current distributor positively connected with the driving device of the type elements, said distributor comprising a movable contact arm and a set of fixed contacts, and thirdly, wires connecting the source of current with the current distributor, the current distributor with contacts in said one set of contacts of the selecting device, contacts in said other set of contacts with said control devices and said control devices with said source of current.

Preferably, each coupling member is provided with two groups of contacts, and the selected contacts of the first contact group intended to cooperate with the first set of contacts of the selecting device are, by preparation in advance, conductively connected with selected contacts in said other contact group intended to cooperate with said other set of contacts of the selecting device.

Preferably, the selecting device provided with the two sets of contacts comprises a holder with grooves or the like intended for receiving the coupling members and in which the coupling members can be inserted so that they are assembled in desired positions behind each other in the holder.

The one set of contacts of the selecting device may comprise contact rails which extend crosswise in relation to the grooves in the holder intended to receive the coupling members, and cross or intersect these grooves, preferably at right angles, and are arranged to cooperate with the contacts of said one contact group of the coupling member, said contact rails being conductively connected with the fixed contacts of the current distributor.

When a coupling member which is prepared in accordance with information to be reproduced is selected, the operator moves the selecting device to a position which according to an indicator provided, corresponds to the position of the coupling member within the selecting device. In case it is deemed suitable, the selecting device is set by manipulating desired keys on a tabulator which in its turn starts the selecting device by means of a motor until the desired position has been reached. A start contact is thereafter closed by the operator, whereupon the printing of the information desired takes place. Lines of desired digit or character combinations can be printed successively by repeating the process.

In the accompanying drawings

Fig. 1 is a left side view of a printing apparatus according to the invention without protection cover and intended especially for printing invoices.

Fig. 2 is a vertical section of the apparatus on the line B—B in Fig. 3.

Fig. 3 is a partial and diagrammatic plan view of the printing apparatus.

Fig. 4 is a side view from the right of a collecting means intended for the coupling members, viz. the holder or selecting device.

Fig. 5 is a vertical section of the holder on the line C—C in Fig. 4.

Fig. 6 is a vertical section of the same holder on the line D—D in Fig. 4.

Fig. 7 discloses schematically a vertical section through the holder together with a device for lifting additional control cards kept in the same which is useful in an embodiment of the printing apparatus arranged also for printing data intended for stock control.

Fig. 8 is a circuit diagram for the printing apparatus.

The printing apparatus comprises a rotatable shaft or roller on which there are mounted a number of type wheels. On the circumferential surface of said roller there are, on half the circumference, provided types for the printing of digits—0, 1, 2, 3, 4, 5, 6, 7, 8, 9. The type wheels are arranged to be set while the roller rotates 180° from an initial or home position. When each of the type wheels has been moved from its initial position to a position intended for printing, the wheel in question is stopped by an electromagnetic stop device. After half a revolution of the roller all type wheels have been set in their printing positions, and the roller stops. The setting operation is thus finished and the printing of the type line comprising the digits takes place. The roller then moves back to its initial position, and during this operation the type wheels are caused to return to their initial positions. This finishes the operation cycle.

The printing apparatus comprises a bottom plate **1** (Figs. 1 and 2), to which are secured two vertical end walls **2**, **2'** (Fig. 3). Type wheels **3** are movably arranged side by side on a roller **4** rotatably mounted in the end walls **2**, **2'**. An electric motor **5** secured to the bottom plate **1** and intended for driving the roller **4** has its pinion **6** in engagement with a gear wheel **8** which is driven in the clockwise direction and which is fixed to a horizontal shaft **9** extending between the end walls **2**, **2'** and rotatably mounted therein. A gear wheel **10** which is rotatably mounted on a pin provided on the outside of the left end wall **2** is in engagement partly with the last mentioned gear wheel **8** and is driven by said gear wheel in the anticlockwise direction, partly with a gear wheel **11** which is mounted on a pin also provided on the outside of the left end wall **2** and which is driven in the clockwise direction during the run of the motor.

In the embodiment of the printing apparatus here described the roller 4 carrying the type wheels **3** shall, during one cycle first rotate in the clockwise direction from

an initial position, during which operation the type wheels 3 are set in their printing positions and then stand still while printing takes place, and thereafter rotate in the opposite or anticlockwise direction back to its initial position, during which operation the type wheels are returned to their initial positions. For this purpose the roller 4 is provided with a fixed gear 7 (Figs. 1, 3), and a slotted rack 12 is displaceably arranged on two pins fixed on the outside of the end wall 2 and meshes with the gear 7. A toothed sector 13 (Fig. 1) is rigidly connected with the gear wheel 11, and another toothed sector 14 is in like manner connected with the toothed wheel 10. Said toothed sectors 13, 14 are so dimensioned and located that the toothed sector 13 during one cycle is temporarily in engagement with the toothed rack 12. This toothed sector 13 rotates together with its gear wheel 11 in the clockwise direction and drives the rack 12 to the right in Fig. 1, by which the gear 7 is caused to rotate in the clockwise direction, carrying with it its roller 4, the setting of the type wheels 3 taking place during this operation. When the type wheels have been set, the toothed sector 13 is disengaged from the rack 12, and the roller 4 thus ceases to rotate. When this position has been reached, the printing takes place. However, in the meantime the toothed sector 14 has rotated, together with its gear wheel 10 in the anticlockwise direction and engages, after the printing, the rack 12 which thereby is driven to the left, i.e. in a direction opposite to the earlier direction of motion. The gear 7 is thus caused by the rack 12 to rotate in the anticlockwise direction together with the roller 4. During this return movement of the roller 4 the type wheels 3 are returned to their initial positions. After this has taken place, the operation is finished.

As mentioned above, the type wheels 3 are rotatably located side by side on the roller 4. In this connection it may be mentioned that in the present embodiment of the apparatus certain type wheels are arranged for manual setting. They are not shown in the drawings, and will not be dealt with hereinafter without this being specially remarked. Each type wheel 3 (Figs. 2, 3) is on half of its circumferential surface provided with types for printing the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, said types—when the type wheels 3 are in their initial positions—being arranged from below with the character 0 nearest to the printing position: 0, 1, 2, 3 and so on. On the remaining half of the circumferential surface of the type wheels 3 there are ten recesses at regular intervals. For each type wheel 3 there is in the roller 4 provided a clutch member which causes the type wheels 3 to follow the rotary motions of the roller 4 but, when meeting a certain resistance, can be caused to stop when the roller rotates in the clockwise direction. In the roller 4 (Fig. 2) there is, in front of front of each type wheel 3, a bore in which a pin 15 is inserted. This pin is, by means of a spring 16 placed in the bottom of the bore, pressed outwards against the inner surface of the respective type wheel 3, said inner surface being provided with a recess. In the initial position of the roller 4 and the type wheels 3 the pin 15 is pressed into the recess by the spring 16 and, when the roller rotates, the type wheel 3 thus participates in the motion of the roller due to the friction caused thereby. However, the type wheel 3 can be caused to stop in the desired position by means of a stop device described below when a braking force is directed against the same, because the recess in the type wheel 3 has such a shape that the pin 15 is pressed into its bore in the roller 4, thereby being released from the recess of the type wheel 3.

A number of electromagnetic stop devices are arranged for the setting of the type wheels in the printing position, each of said stopping devices being associated with and actuating one corresponding type wheel 3. Between the end walls 2, 2' there is fixed a shaft 17 parallel to the type wheel roller 4 and above the same (Fig. 2). A latch 18 is rotatably arranged, on said shaft 17 opposite to each type wheel 3. Said latch can be actuated by an electromagnet 19, the core of which is articulately connected with the latch. All the electromagnets are carried by a horizontal bar secured between the end walls. In inoperative position the latch 18 rests, with its upper portion, against the curvature of a spring 20 located on a rod 21 extending between the end walls 2,2' and holding the same together. In the operative position the latch 18 is, due to actuation from its electromagnet 19, tilted in the anticlockwise direction so that the upper portion of the latch 18 has been pressed past the curvature of the spring 20 while the lower end of said arm, which is formed as a stop, has been introduced into one of the recesses in the type wheel 3. During the rotation this type wheel is thereby forced to stop and is prevented from continuing its motion with the rotating roller 4. When the roller 4, after printing has taken place, rotates back to its initial position, the pin 15 is, during some instant of said operation of the roller 4, pressed into the recess of the type wheel 3. As a consequence, the type wheel 3, the electromagnet 19 of which, as will be described below, is then inoperative, is forced to follow the roller when the latter returns to is initial position. During the initiation of this return movement of the type wheel 3 the latch 18 is caused by said type wheel to be tilted in the clockwise direction, and therefore the upper portion of the latch 18 is moved towards and past the curvature of the spring 20, and is fixed there by this spring in inoperative position. When the type wheel 3 has returned to the inital position after the printing moment, a projection 22 extending from the wheel is moved towards a horizontally arranged rod 23 secured between the end walls (Fig. 3) by which the type wheel 3 is caused to assume an exact starting position.

A substantially horizontally arranged channel 23' (Fig. 2) for feeding the invoice material is carried between the end walls 2, 2'. A printing hammer 25 (Fig. 2) has its arm 26 movably arranged on a shaft 27 fixed between the end walls 2, 2'. A spring 28 is fixed between the rear end of the arm 26 and the bottom plate 1, and exerts a pull downwards on the rearwardly directed end of said arm. A downwardly directed hook 29 on the intermediate portion of the arm 26 rests against the circumference of a disk which is fixed to the shaft 9, and provided with a recess which forms a shoulder. When said shaft which, as stated above, rotates in the clockwise direction, rotates, the arm 26 with the printing hammer 25 is, due to the pull action of the spring 28, caused to move quickly in the anticlockwise direction—i.e. perform a printing stroke—when the shoulder of the disk 30 passes the point of the hook 29. The invoice material is fed in the channel 23' by means of two feed wheels 31 fixed on pins and rotatably mounted on the insides of the end walls 2, 2'. Recesses are made for said wheels in the channel 23', which also shows a recess provided below the type wheel row for the printing hammer 25, through which recess said hammer performs printing strokes against the type wheels 3. The feed wheels 31 are each rigidly connected with a concentrically mounted gear wheel 32 (Fig. 2), which, during the rotation of the shaft 9, is driven stepwise in the clockwise direction by a feed pawl 33 which is movably connected with an arm 34 movably mounted on a pin at the end wall 2, and 2' respectively. Said arm 34 rests against and is driven by an eccentric 35 fixed on the shaft 9. Two press rollers 24 which are movably carried by spring-loaded arms 24A, hold the paper pressed against the feed wheels 31, and are adapted to be raised from the feed wheels 31 upon depression of a rod 24B connecting the arms 24A. A mechanism (not shown) for feeding the ribbon is driven by a cam located on the shaft 9 in cooperation with a lever actuating said mechanism.

According to Fig. 8 the drive motor 5 of the printing apparatus is connected to the source of current through the conductors 36 and 37. By means of the starting handle 38 (Figs. 4, 6, 8) the contact 39 is closed, the

motor being thus started. The handle 38 is held against the action of the spring 39' (Fig. 6) in the starting position until the cam 40 (Figs. 1, 3, 8) has closed its contact 41, whereafter the circuit is automatically held closed till the printing has taken place and till the type wheels 3 have been returned to the initial position.

The selecting device which is adapted to receive and contain prepared coupling members 70 (Fig. 8) which, due to their insertion in the holder provided therefor, may be easily selected for establishing conductive connections, comprises i.a. a current distributor, the contact arm 42 (Figs. 1, 8) of which, according to the present embodiment, is fixed to one end of the roller 4 carrying the type wheels 3, and rests against a conductive rail 43 (Fig. 8) which is connected to the source of current by means of the conductor 44. A disk mounted on the end wall 2 carries the contacts 45A–45M of the current distributor, which contacts correspond to the number of types (digits or characters) on each of the type wheels 3 and which are, through individual conductors 46, connected to corresponding contact rails 47A–47M (Figs. 4, 8). The selecting device constituting the holder for the coupling members (70) is, according to Fig. 4, which shows the holder as seen from the right, built on a bottom plate 49, on which two parallel end walls 50 are vertically located, said end walls being at the top held together by two bars 51. Between the end walls 50 and spaced from the bottom plate 49 there are arranged two parallel side walls (not shown), in which there are provided vertical grooves corresponding to one another for receiving prepared coupling members 70 for insertion in the holder, said coupling members being pushed down into the pairwise arranged grooves. The coupling members are kept in upright position one behind the other in the holder, parallel with the end walls 50 and in spaced relationship as determined by the grooves. The abovementioned contact rails 47A–47M are parallel to each other and are located horizontally in a certain spaced relationship at the left side wall of the holder, and extend along the whole space intended for the insertion of the coupling members. Thus, inserted coupling members 70 can be caused to contact, with their corresponding contact points, adapted for this purpose, a contact rail 47A–47M. The coupling members 70 are, by means of a suitable resilient device, held in their intended positions in the holder in permanent contact with the contact rails.

The selector provided for selecting one of the coupling members 70 inserted in the holder is, according to the present embodiment, arranged upon the holder. A forked carriage 52 has its shanks directed downwards and is carried by the bars 51 along which it may be displaced. The ends of the shanks are located in the vicinity of the bottom plate 49 and between said ends a yoke 54 is so arranged that its free ends may be lifted or lowered, said yoke extending with its intermediate portion substantially between the side walls and below the same. The intermediate portion of the yoke 54 rests on a lifting arm 55 which is eccentrically mounted and extends between the end walls 50, said lifting arm being operated by the abovementioned starting handle 38, which is adapted for lifting the yoke 54 as well as for controlling the start contact 39 of the motor 5, said start contact being actuated by an arm 53 fixed to the starting handle 38. On the intermediate portion of the yoke 54 there are located fifteen adequately spaced contact springs 56AA–56TT, the number of which corresponds to the number of type wheels 3 and to the number of the electromagnets 19AA–19TT controlling said type wheels. When the yoke 54 is raised by means of the lifting arm 55, each of the contact springs 56AA–56TT is pressed against a corresponding contact point on a coupling member 70 deposited in the holder. One contact group of all coupling members 70 contained in the holder may in this way be contacted by said contact springs 56AA–56TT because, as mentioned above, the carriage 52 can be moved along the holder on the bars 51 and because, as has been earlier indicated, the coupling members 70 are assembled to a symmetrical unit, standing one behind the other in predetermined spaced relationship, and therefore corresponding contact points arranged on different coupling members lie behind one another on a straight line in the direction of movement of the carriage. The desired coupling member can be selected for contacting the contact springs 56AA–56TT in the manner just described by moving the carriage 52 to a position which, according to an indicator 59, corresponds to the position of the selected coupling member within the unit—in the present case the number is shown which has been given to a certain kind of packet. Two bars 57 disposed horizontally between the end walls 50 and in the vicinity of the side walls are, on their lower sides, provided with recesses dimensioned in such a manner, that upwardly directed projections 58 arranged on the yoke 54 can be moved into the recesses if the contact springs 56AA–56TT have been displaced to a position suitable for contacting the contact points of a coupling member 70. If this should not be the case, the contact springs 56AA–56TT cannot be lifted. The upper side of the right bar 51 is provided with teeth which control the setting of the indicator 59. A gear wheel included in this device meshes with said teeth.

According to Fig. 8 each of the contact springs 56AA–56TT is, each by means of its conductor 60, connected to one terminal of a corresponding electromagnet 19AA–19TT included in the electromagnetic blocking system controlling the type wheels 3. The other terminal of said electromagnet is connected to a bus 61 which, by means of the conductor 62, is connected to the source of current. A cam 63 (Figs. 1, 3, 8) located on the shaft 9 (Figs. 1, 3) holds, during the setting of the type wheels, its contact (Figs. 1, 8) closed, by which the rail 43 of the current distributor is connected to the source of current, but at the return of the type wheels to their initial positions the contact is opened due to which fact the electromagnets 19AA–19TT now cannot be energized and exert a blocking action on the type wheels.

The purpose of the coupling members 70 is to serve as conductive connections between the contacts of the control device 4 (i.e. the electromagnets) and the contact rail of the current distributor. For this purpose it is necessary that the coupling members 70 are provided with a required number of mutually interconnected conductive contact points (66, 67, Fig. 8) which are to be placed in such order that they correspond to those contacts—contact rails 47A–47M and contact springs 56AA–56TT to which they are to be connected. The required contact points are borne by a body of suitable shape, preferably of sheet material. According to the construction of the described embodiment of the printing apparatus which comprises a holder for the coupling devices 70 with contact rails and a selector with contact springs, the coupling members may suitably comprise bodies of non-conducting material formed as plates, cards or the like, at the edges of which contact points of conductive material having one plane surface for contacting the contact rails and the contact springs are fixed, the spacing between the contact points being adjusted according to the spacing between the devices intended for contacting purposes (the rails and the springs respectively). For preparing the coupling devices 70 conductive bodies are placed insulated from each other between the desired contact points. Through these bodies current is conducted between the contact rails 47A–47M and the contact springs 56AA–56TT in the combination which is desired when the coupling members 70 are being connected. In an embodiment the coupling members may be formed as conductive members placed on a body which, when the coupling member is being prepared, are caused in desired combinations conductively to interconnect the desired contact points. It is also possible to form and place these conductive members on the body in such a way, that they to some part of their extent serve as contact points. Fig. 8 is a schematic view of a coupling member 70 of which

the various desired contact points are by means of conductors interconnected in such a way, that the desired individual electromagnets can be energized when the coupling member is being selected to establish the connection desired.

The printing apparatus as described above is according to Fig. 8 provided with fifteen type wheels 3, each of which is provided with the digits 0–9. The type wheels 3 are divided into four groups (not shown in the figure), of which the four wheels according to Fig. 8 located farthest to the right and forming the first group, are intended to print the packet number of the goods, the three wheels located to the left of the first group to print the number or weight, the next four wheels the price per packet, and the four wheels 3 located farthest to the left and forming the fourth group, are intended to print the total amount.

During the course of printing, the invoice material is advanced in the direction towards the operator, and the packet number of the goods is printed on the invoice farthest to the left of each line.

An order is assumed to include among other things the packet number of goods 730, the weight 180, the price per packet 4:65 and the total amount 837.–. For each goods packet there is a coupling device 70 prepared in advance, bearing the data required for printing an item concerning the packet. The coupling members 70 thus prepared are located in their places on the holder. The coupling member being prepared for the item in question is according to Fig. 8 provided with conductors between the various contact points. The packet number printed by the type wheels, which in Fig. 8 are situated farthest to the right, comprises three digits, so that only three of the four type wheels of this group are used, and the coupling member is therefore prepared with regard hereto. The contact point 67 which on the figure is shown located farthest to the left, corresponds to the contact spring 56AA which by means of its conductor 60 is connected to the electromagnet 19AA. Said electromagnet controls the first type wheel in the group printing the goods packet number. However, as this number comprises only three digits, the respective type wheel should not be allowed to take part in printing the item. For this reason, the contact point on the coupling member which corresponds to the contact spring 56AA is not connected to any of the contact points 66 bearing against the contact rails 47A—47M. Therefore, the type wheel controlled by the electromagnet 19AA is during the operation of the apparatus not blocked, but follows the rotation of the roller 4 and stands during printing facing the printing line with a typeless field. The first digit of the packet number is seven. According to this the contact point 67, which corresponds to the contact spring 56BB is by means of a conductor connected to the contact point 66 bearing against the contact rail 47K which by means of a conductor 46 is connected to the contact 45K of the current distributor. The next digit in the group is three. Therefore, the contact point 67 corresponding to the contact spring 56CC, is by means of a conductor connected to the contact point 66 bearing against the contact rail 47D. The last digit in the group is zero. The contact point 67 in the coupling member corresponding to the contact spring 56DD is therefore in the same way connected to the contact point 66 bearing against the contact rail 47A.

The following data in the item—weight, price per packet, and total amount—are as shown in Fig. 8 in a similar way by means of preparation stored in the coupling device. When an invoice including the above item is being printed, the operator inserts an invoice form in the groove 23 (Fig. 2). Thereafter, the selector is moved by the operator to a position where the indicator 59 shows the number which corresponds to that of the goods packet i.e. 730, whereafter the handle 38 (Figs. 3, 6, 8) is momentarily moved to the right (in Fig. 6 counter-clockwise, in Fig. 8 clockwise). By this the arm 55 lifts the yoke 54 bearing the contact springs 56AA–56TT, the latter being pressed upward against the contact points 67 (Figs. 4, 5, 8) of the coupling member 70, so that the springs are pressed against the group of contact points facing the front. In the final stage of the movement of the handle 38 to the right, the arm 53 (Figs. 4, 6, 8) closes the contact 39, and a circuit from the conductor 44 (Fig. 8) via the conductor 36, the motor 5, the contact 39 and the conductor 37 to the conductor 62 is established. When then the motor starts running, the contact 41 being operated by the cam 40 on the shaft 9 (Figs. 1, 2, 3) is closed, and the circuit of the motor is permanently closed, whereafter the motor during the whole operation is fed with current. The operator can therefore release the handle 38, which then owing to the effect of the spring 39 (Fig. 6) on the arm 53, is moved somewhat to the left (in Fig. 8), with the result that the shunt contact 39 is opened.

When the motor 5 starts running, the roller 4 is according to the above caused to rotate clockwise. The type wheel 3 follows this movement of the roller 4 and moves its elements successively into printing position. The elements which print identical characters, are simultaneously moved into this position—first a line of zeros (fifteen zeros=the number of type wheels), then a line of ones, of twos, etc. The contact arm 42 (Figs. 1, 8) placed on the roller 4 moves with the roller. When the zero printing elements are in printing position, the conductive part of the contact arm 42 contacts the contact 45A (Fig. 8). On this the contact rail 47A is temporarily connected to the source of current: the conductor 44, via the contact 64 closed by the cam 63 (Figs. 1, 8), the rail 43, the conductive part of the contact arm 42, the contact 45A and its conductor 46 to the contact rail 47A. Owing to the preparation of the selected coupling member 70, a circuit for each of the electromagnets 19DD and 19HH is closed at the same time when the contact rail 47A is connected to the source of current, namely for the electromagnet 19DD from the contact rail 47A via the contacting contact point 66, through the conductor to the contact point 67 arranged during the preparation, the contact springs 56DD, their conductor 60, the winding of the electromagnet 19DD, the bus 61 and the conductor 62 to the source of current. The electromagnet is energized, and when its core is attracted the latch 18 is affected to rotate counterclockwise and to block the type wheel 3 when digit zero is in printing position. As to the electromagnet 19HH, also this is energized when its type wheel has its digit zero at the same time in printing position, a current being conducted from the contact rail 47A through the conductor which during the preparation of the coupling member 70 was intentionally arranged between the proper contact points 66 and 67, via the coupling member 70 to the contact springs 56HH, the conductor 60 to the winding of the electromagnet 19HH, the bus 61 and the conductor 62. This electromagnet 19HH is energized at the same time as the electromagnet 19DD, and the type wheels of both are blocked in position for printing the same characters, namely the zeros included in the packet number and weight indication. When during the continued movement of the roller 4 the contact arm 42 reaches the contact 45B, the non-blocked type wheels have their digits one in printing position. The electromagnets which owing to the preparation of the coupling member are connected to the contact rail 47B are hereby energized to control the respective type wheel—in this case only the electromagnet 19EE—and to block this type wheel for printing the digit one included in the weight indication.

Gradually, as the roller causes the type wheels to move their various elements into printing position, the controlling electromagnets are connected in circuits, as they in accordance with the preparation of the coupling member 70 are intended to block the type wheels. That or those electromagnets, which are connected to the contact rail

47A, block their type wheels when they are in position for printing the zeros, to the contact rail 47B for the ones, to 47C for the twos, to 47D for the threes and so on. After about 180° revolution of the roller, all type wheels intended for printing are positioned, whereafter as described before the roller stops and the printing can take place, i.e. the printing hammer performs a printing stroke. The contact arm has then reached an extreme position and the contact 64 which is controlled by the cam 63 is broken. After printing the roller rotates in the opposite direction back to its original position, thus causing the type wheels to return to their original positions. Owing to the fact that the contact 64 is broken, the electromagnets are not permitted during simultaneous return movement of the contact arm 42 to be energized to control the operation of the type wheels. When the contact arm 42 has reached its original position, the contact 64 is due to the effect of the cam 63 closed again. Immediately thereafter the contact 41 is broken by its cam 40, thus breaking the circuit of the motor and stopping its running.

When a new item is to be printed on the invoice, the method is repeated: A coupling member 70 is connected by positioning the selector in right position and the start handle is moved into start position. The invoice form is advanced step by step for each printing operation whereby the items on the invoices are placed below each other.

If desired, a plurality of holders can be simultaneously connected to the apparatus, whereby a large number of coupling members 70 can be stored.

According to an embodiment, the holder can be designed in such a way, that cards, for example of cardboard and intended for special purposes, can be placed in grooves arranged between the coupling devices. These cards can be provided with text, stating the information which an adjacent coupling member in the holder by preparation is made to bear, which is a preferable expedient as the coupling member 70 due to its nature cannot be provided with text. According to a refinement, the printing apparatus comprises two series of type wheels—one series intended for printing of invoices, and one for printing on cards intended for control purposes, stock cards. These stock cards can as indicated above be placed adjacent to the corresponding coupling members in the holder. The cards thus placed can by means of a device shown in Fig. 7 be lifted up from their places, when a coupling member by means of the arm 55 is brought to complete the electrical circuit by means of the lifting of the yoke 54. A lifting arm 69 movably arranged on the arm 55 has its one end pressed upward against the card which is thus lifted a little from its place and can be taken up by the operator. The card is thereafter placed in a special position for printing by the type wheels belonging to the type wheel series arranged for printing on the stock cards. According to this embodiment of the printing apparatus, the start contact 39 of the motor can be located adjacent to the position in which the stock cards are placed for printing. When a stock card is placed in this position, the start contact 39 is actuated by the card in such a way that the circuit of the motor is closed and the motor is started. This can be effected by means of shears as explicitly described in the Swedish Patent No. 156,868. The invention is not limited to the embodiments described and shown above, but can within the scope of the following claims be modified in various respects.

What I claim is:

1. Electrically controlled printing apparatus comprising a plurality of movably arranged type elements each having selectively positionable printing characters, driving means common to all of said type elements disposed to drive said elements synchronously, a stop member operatively associated with each of said printing elements and controllably disposed to arrest an element when a selected printing character is in printing position, manually controllable electrically operated selector means controlling each of said stop members, means responsive to the arresting of said printing elements by said stop members for causing the printing of all the selected printing characters when movement of said printing elements has been arrested, an energizing circuit adapted to connect said electrically operated means to a source of electric current and comprising a selected one of a plurality of coupling members each representing specific information to be printed, selecting means adapted to select a predetermined one of said coupling members to be operative, a first set of fixed contacts, a first set of movable contacts, said contacts belonging to said selecting means and adapted to be interconnected in said energizing circuit, a movable contact driven positively by said driving means, a second set of fixed contacts sequentially engageable with the last mentioned movable contact, and circuit means serially connecting one terminal of said source of electric current, the last mentioned movable contact, the second set of fixed contacts, the first set of fixed contacts, the coupling members, the first set of movable contacts, said electrically operated selector means and the other terminal of said source, there being two groups of contacts provided for each of said coupling members, the contacts of one group being disposed to cooperate with the first set of fixed contacts of said selecting means and the contacts of the other group being disposed to cooperate with the first set of movable contacts in a predetermined arrangement.

2. Electrically controlled printing apparatus as set forth in claim 1, wherein two groups of contacts are provided for each of said coupling members, the contacts of one group being disposed to cooperate with one of said two sets of movable contacts and the contacts of the other group being disposed to cooperate with the other of said two sets of movable contacts in selectively controllable predetermined arrangement.

3. Electrically controlled printing apparatus as set forth in claim 1, wherein said selecting means comprises a holder having grooves formed therein for receiving said coupling members so that they are assembled in predetermined positions one behind another in said holder.

4. Electrically controlled printing apparatus as set forth in claim 1, including restoring means to return each type element after printing to an original preset position.

5. Electrically controlled printing apparatus as set forth in claim 3, wherein one set of contacts of said selecting means comprises contact rails that extend crosswise of said grooves, and means to conductively connect said contact rails with said fixed contacts.

6. Electrically controlled printing apparatus as set forth in claim 5, wherein the one set of contacts of said selecting means comprises a plurality of contact springs, the path of motion of said selecting means being substantially parallel to and of the same length as said contact rails.

7. Electrically controlled printing apparatus as set forth in claim 6, further comprising indicating means disposed to show the position of said selector means relative to the coupling member associated therewith.

8. Electrically controlled printing apparatus as set forth in claim 7, wherein said selecting means comprises means defining a plurality of grooves equal in number to the maximum number of coupling members insertable simultaneously therein, and said grooves being arranged to receive said information representing means.

9. Electrically controlled printing apparatus as set forth in claim 8, including means to lift an information representing means when contact points of a coupling member connect with selected contact springs of said selector means.

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