

May 13, 1958

O. HABERKORN
ZERO PRINTING DEVICE
Filed Dec. 27, 1955

2,834,289

Fig. 1

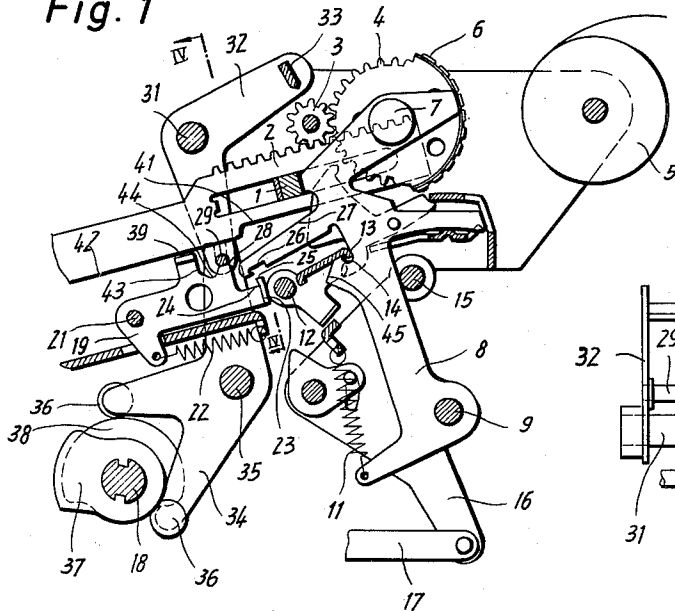


Fig. 3

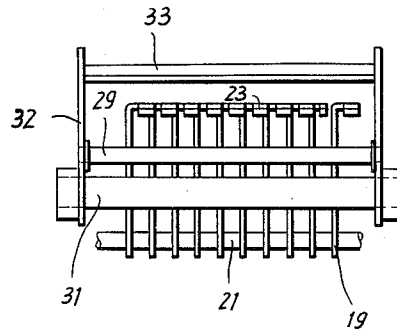


Fig. 2

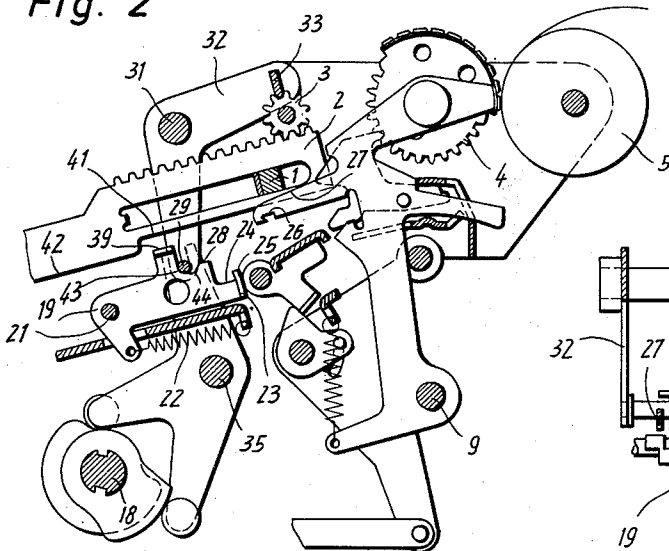
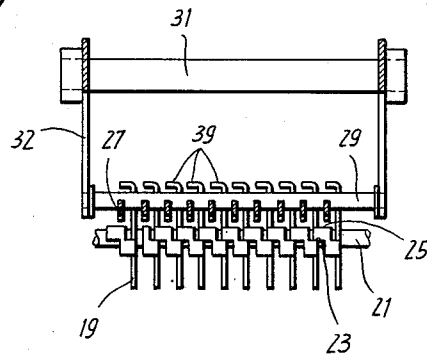


Fig. 4



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ZERO PRINTING DEVICE

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Application December 27, 1955, Serial No. 555,730

Claims priority, application Germany January 18, 1955

4 Claims. (Cl. 101—95)

The invention relates to zero-printing devices for adding and calculating machines in which the printing of the zero-digits of the amounts to be printed by the machine is controlled in that all zero-digits to the left of the first significant digit are eliminated whereas all zero digits appearing on the right of said first significant digit are printed.

The invention relates more particularly to machines in which the type carrier of each denomination in the form of a type segment or type wheel is pivotally mounted on a spring actuated lever and is bodily and hammer like impressed against the platen for digit printing when released from its latch member in the form of a bridging member holding it usually in its normal position. These bridging members which coast with each other through lateral overlaps cooperate, on the one hand, with the differential members connected with the type carriers, on the other hand, with the levers of the type carriers or the type carriers themselves. In zero-printing devices of this kind the bridging members usually engage, by means of feeling projections, notches of the type carriers or of the differential members connected thereto, when the latter are in their zero-position.

When one of the differential members is moved from its zero position into a significant-digit position a feeling projection of the associated bridging member will be lifted out of the associated notch, releasing the concerned type carrier. By means of said overlaps one fixed to each bridging member and overlying the bridging member following to the right all bridging members located on the right will be taken-with to likewise release their type carriers and to enable the zero-digits on the right of the order adjusted on a significant digit to be printed.

The main object of the invention resides in the provision of an improved zero printing device of the said kind, in that means are provided for to avoid the increase of resistance of movement which is to be overcome by one differential member when several or all of the bridging members are to be lifted out of their notches.

A further object is to avoid considerable wear and tear of said overlaps when one of them has to lift several or all other ones out of their notches.

To the above and other ends which will appear in the course of the description, the invention consists of certain features of construction and certain combinations and arrangements of parts, all of which will be fully described herein and particularly pointed out in the claims.

Fig. 1 is a lateral view of the printing device together with the cooperating zero printing device in the position of rest of the aligning bail and the position "5" of the shown differential rack.

Fig. 2 is a corresponding partial view in the locking position of the aligning bail and the printing position of the shown type segment adjusted in its zero position.

Fig. 3 is a top view of Fig. 2.

Fig. 4 is a section along the line IV—IV of Fig. 1.

The differential racks 2 longitudinally guided by means of four-edge bars 1 are adjustable by means of digit keys

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in a well known manner from a zero-position represented in Fig. 1 into positions corresponding to the digits 1 to 9 and being constantly in mesh with intermediate wheels 3, which mesh with gear teeth 4 provided on type segments 6, cooperating with a platen 5. Said differential racks 2 and type segments are located in adjacent plains so that the movement of the differential racks is not hampered by the type segments, the intermediate wheels being wide enough to engage at the same time both the differential racks and the gear teeth. The type segments 6 together with the gear teeth 4 are pivotally mounted by means of pins 7 on swinging levers 8. The swinging levers 8 are rockably mounted on a common bar 9, thus that they can be rocked from their position of rest represented in Fig. 1, in which the gear teeth 4 are in mesh with the intermediate wheels 3, to the right till they strike with the adjusted type on the platen 5 (see Fig. 2). This impression movement of the swinging levers 8 is effected by springs 11, after a common locking bail 13 mounted on a shaft 12 has been rocked out of notches 14 of the swinging levers 8. The returning of the type segment swinging levers 8 into the shown position of rest (Fig. 1) is effected by a restoring bar 15 supported by lever segments 16, which by means of a pushing bar 17 will be moved at the right time by cam discs not shown mounted on the main drive shaft 18.

The type segments 6 are brought with the types corresponding to the adjustment of the differential racks according to the digit introduced into the machine, or, upon totalizing, according to the value contained in the totalizer wheels. During the printing rocking and the return rocking of the swinging levers 8 the type segments will be kept locked, in their position adjusted by means of the gear teeth 4 in a manner well known in the art.

The zero printing control, i. e. the printing of the zero digits in all of the denominational orders on the right of the order in which the first significant digit is introduced and the suppression of the printing of the zero digits on the left of said order with the first significant digit is effected, in a manner known per se, by bridging members 19, which are rockably mounted on a cross bar 21. The bridging members are each actuated by a tension spring 22 and are connected with each other by overlappings 23 (Fig. 4). Each bridging member 19 has fixed to it an overlap 23 which extends to the right and overlies the narrow edge of the neighbouring bridging member 19 on its right hand side so that, when the bridging member of the order which is adjusted on a significant digit is held below, all of the bridging members of the orders following to the right of it are likewise held below.

The overlappings 23 further cooperate by means of locking projections 25 (Fig. 2) at their upper ends with recesses 26 of extensions 27 of the swinging levers 8. When a locking projection 25 engages the associated recess 26 the corresponding swinging lever 8, when released by the locking bail 13, will be retained so that a printing of the adjusted type of the type segments 6 can not take place.

Each bridging member 19 is still further provided with a projection 28 cooperating with a retaining bar 29 of a locking and aligning bail 32 rockably mounted on a shaft 31. The locking bail can engage the intermediate wheels 3 by means of an aligning bar 33 aligning and locking thereby the intermediate wheels 3 together with the differential members 2 and the type segments 6 when in mesh therewith in the adjusted digit position.

The swinging motion of the locking bail 32 will be transmitted by a roller lever 34, rockably mounted on a stationary disposed shaft 35. The roller lever 34 being reciprocated by cam discs 37, 38 mounted on a main drive shaft 18. When the locking bail 32 is found in the position releasing the intermediate wheels 3, as represented in Fig. 1, the retaining bar 29 being above the projections

28 retaining all bridging members 19 against the action of the springs 22 in their lower rocking position, in which the locking projections 25 lie out of their recesses 26. Finally, each bridging member 19 is still provided with a feeling finger 39, which cooperates with the lower narrow face 41, 42 of the associated differential member 2. Between the feeling finger 39 and the projection 28 each bridging member is provided with a cut-out 43 and a bevel face 44.

The described device works as follows: In the position of rest of the machine represented in Fig. 1 the locking projections 25 are held out of mesh with the recesses 26 of the swinging-levers 8 and the feeler fingers 39 out of contact with the stepped face 41, 42 of the differential members by the aligning bail 32, 29. In the above suggested manner the differential members can be adjusted into their different digit positions unhampered by the zero printing device. After adjusting the differential members they will be aligned and locked at the beginning of the revolution of the main shaft 18 by means of the locking bar 33 through the roller levers 34 in their adjusted value position. During this counter clockwise swinging of the aligning bail 32 the retaining bar 29 leaves all projections 28 of the bridging members and the latter are enabled to move upwards under the action of their springs 22. When one of the feeling fingers 39 touches the raised part 42 of the narrow face of its differential member the swinging motion of the corresponding bridging member will be stopped before its locking projection 25 has engaged the recess 26. By means of the overlappings 23, at the same time, all bridging members on the right of the denomination in question are retained in their position releasing the swinging levers 8, in so far as the associated differential members or type segments 6, respectively, should be in its zero position. The feeling fingers 39 of the other bridging members 19 on the left of the denomination adjusted on the first significant digit, are enabled to move towards the deeper part 41 of the lower narrow face of the differential member, whereby the locking projections 25 enter the recesses 26 and lock the swinging levers 8 in their position of rest, so that the latter can not be rocked by their springs 11 when they are released by the locking bail 13 upon further movement of the drive shaft 18. A printing impression in these left hand denominations the type segments of which are adjusted on zero, therefore, cannot take place.

After performance of the printing the rocked swinging levers 8 are returned by means of the restoring bar 15 into their home position, in which they are locked again by the locking bail 13 raised by the bevel faces 45 of the swinging levers and snapping into the notches 14. After that the returning of the locking and aligning bail 32 into the releasing position, represented in Fig. 1, will be effected by means of the roller lever 34. Thereby all bridging members are returned into their position of rest, as represented in Fig. 1, by the restoring bar 29 acting on the bevel faces 44. In this position of rest of the bridging members all differential members 2 are released again. Finally, the returning of the moved differential members and type segments into their zero-position takes place, which can be effected unhampered by the feeling fingers 39 of the bridging members 19.

What I claim is:

1. In a printing device for adding and calculating machines including a platen, having in each denomination: a type carrier with a series of types 0 to 9 adapted to be bodily impressed against the platen, a differential member for adjusting said type carrier with each of its types into the printing position and having an edge with a recess portion, a spring actuated bridging member adapted to assume a locking and an unlocking position, a feeling finger on said bridging member cooperating with said edge

and recess portion, causing the unlocking position of the bridging member when it touches said edge and permitting the bridging member to be urged into its locking position when said recess portion being adjusted in its reach, a locking lug on said bridging member adapted to lock said type carrier in its home position when the bridging member is in its locking position, an overlap fixed to the bridging member overlying the bridging member of the neighbouring denomination to the right adapted, when its bridging member assumes the unlocking position, to hold said bridging member neighbouring on the right and the ones following to the right in unlocking position, and a retaining member adapted to hold all bridging members in their unlocking position when the differential members and type carriers perform their adjusting movement.

2. In a printing device according to claim 1, said retaining member having the form of a cross bar, said bridging members comprising each a projection cooperating with said retaining bar, a cut-out in each bridging member, a bevelled side face of said projection passing over into said cut-out, means for moving said retaining bar, transversely to its direction, into two end positions, whereby in the one end position the retaining bar presses on said projections holding the bridging members in their unlocking position, while in the other end position the retaining bar engages said cutouts to permit the bridging members to be urged into their locking position, whereas by returning the retaining bar to the first said end position the bridging members will be moved by the aid of said bevelled faces into their unlocking position.

3. In a printing device according to claim 1, and in each denomination an intermediate gear wheel between said differential member and said type carrier, said retaining member having the form of a rockable bail adapted to lock and align said differential members and type carriers in their adjusted position, a locking and aligning bar on said bail located above said differential members and cooperating with said intermediate wheels, downwardly directed extensions at the bail supporting said retaining member in the form of a cross bar, said bridging members comprising each a projection, a cut-out and a bevelled face cooperating with said retaining bar, said projection passing over into said cut-out, whereby in the locking position of said bail the retaining bar engages said cut-outs to permit the bridging members to be urged into their locking position whereas on the movement of the bail out of said cut-outs into its unlocking position the retaining bar presses the bridging members with the aid of said bevelled face into the unlocking position.

4. In a printing mechanism according to claim 1, and in each denomination a swinging lever pivotally mounting said type carrier and guiding it out and home between the home position and the impression position, a locking recess in the swinging lever cooperating with said locking lug of the bridging member to lock the swinging lever together with the type carrier in the home position, said locking lug being integral with said overlap, a notch in each swinging lever and a second retaining bail common to all of the swinging levers adapted to temporarily hold the swinging levers in their home position cooperating with said notches.

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