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IN AN ACTIVE POSITION THEREOF

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3 Sheets-Sheet 1

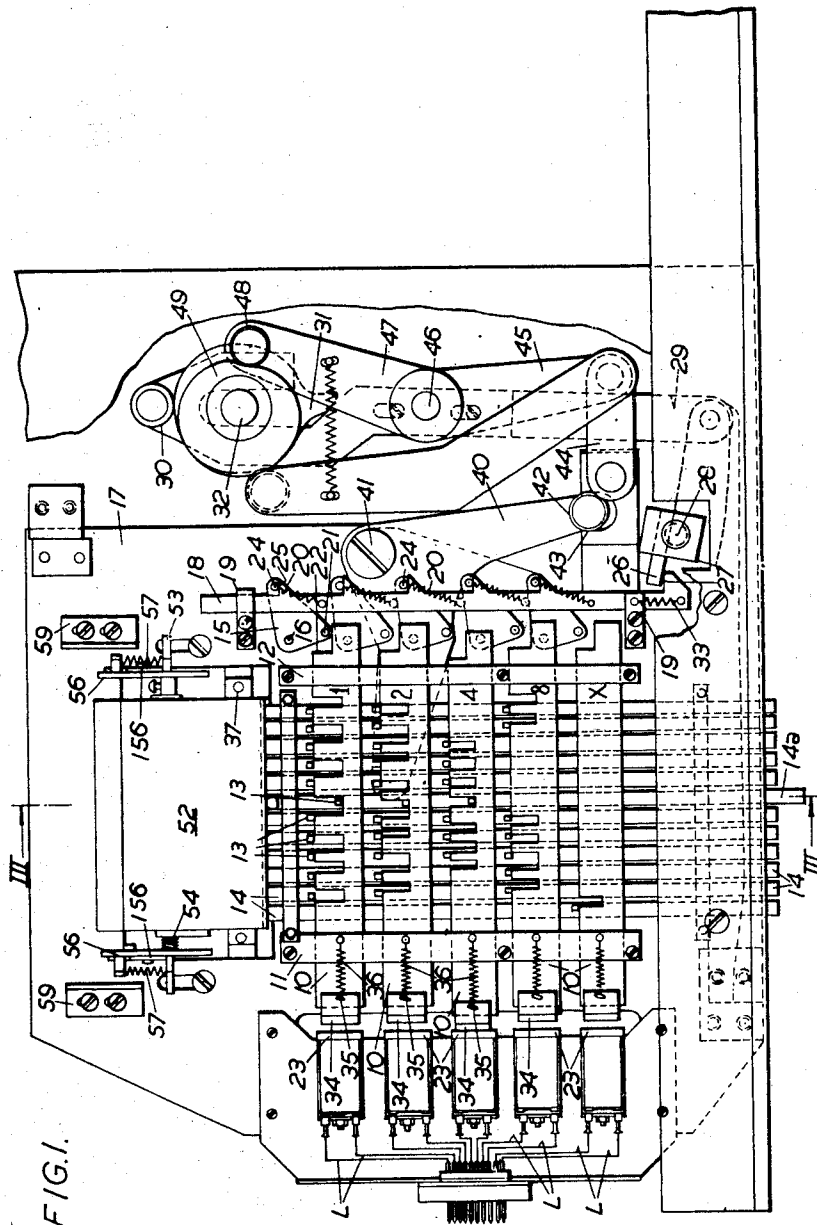


FIG. 1.

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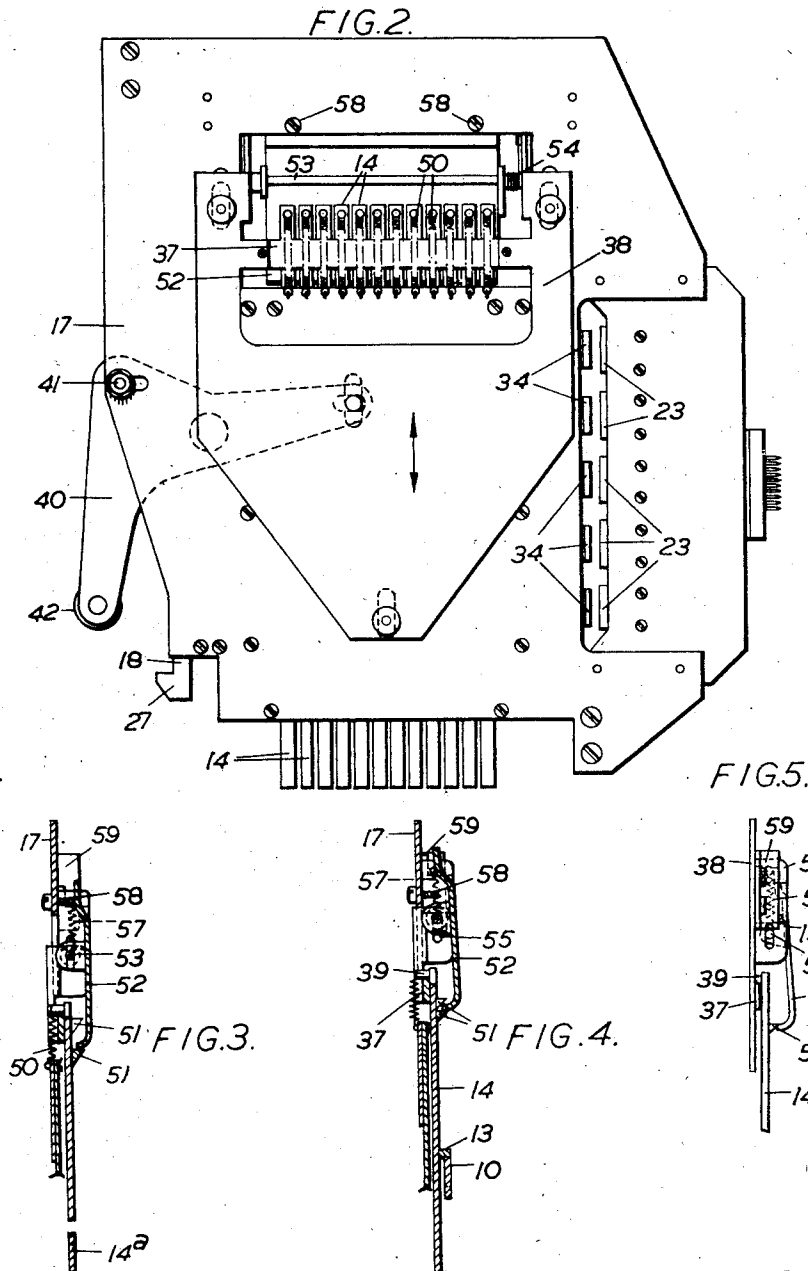
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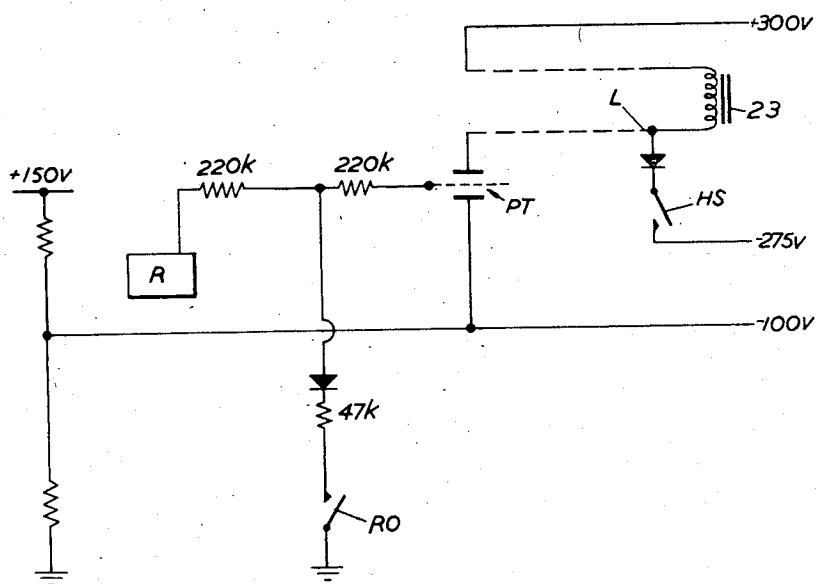
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FIG. 6.



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APPARATUS FOR RETAINING A MACHINE MEMBER IN AN ACTIVE POSITION THEREOF

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Claims priority, application Great Britain
October 31, 1952

6 Claims. (Cl. 235—61.6)

This invention relates to apparatus for retaining a machine member in an active position thereof.

According to the present invention there is provided for retaining a machine member in an active position thereof apparatus comprising actuating means to engage and positively to move said member from the inactive to the active position thereof, a solenoid the pole of which is engaged by said member in its active position, circuit means to energise said solenoid thereby to retain said member in its active position, and a restoring element to restore said member to the inactive position thereof on non-energisation of the solenoid. In a preferred embodiment of the invention a self-aligning armature is carried by the machine member for engagement with the pole of the solenoid.

In one embodiment of the invention there is a plurality of machine members each for co-operation with an actuating member and a solenoid independent thereto, the machine members comprising the code bars of a decoding unit and cooperating with testing members movable relative thereto, there being provided an operating member common to all the actuating means to effect simultaneous movement of all the code bars from the inactive to the active positions thereof. Each actuating means may comprise a pivoted plate, an abutment carried by the plate to engage the code bar appropriate thereto, and a spring connecting the plate to said operating member to effect pivotal movement of the plate on actuation of the operating member thereby through said abutment to effect movement of the code bar from the inactive to the active position thereof. Actuation of the operating member may be effected by a cam and linkage connecting the cam with the operating member, thereby to effect movement of the operating member to a position beyond that at which the springs have completed rocking of said plates to move the code bars into co-operation with their solenoids and so ensure proper co-operation between the code bars and solenoids.

In order that the invention may be clearly understood one embodiment thereof will now be described, by way of example, with reference to the accompanying drawings which illustrate a decoding unit for use in a record card controlled statistical machine, and in which:

Fig. 1 is an elevation, having some parts broken away, illustrating a de-coding unit embodying the present invention,

Fig. 2 is a view of the rear of the unit shown in Fig. 1 and illustrates some of the parts disposed at the rear of the unit,

Fig. 3 is a section on line III—III, Fig. 1,

Fig. 4 is a view of a part of Fig. 3 showing some of the parts thereof in different positions,

Fig. 5 is an end elevation of the upper part of the apparatus shown in Figs. 3 and 4, and

Fig. 6 is a circuit diagram illustrating the manner in which the solenoids employed in the de-coding unit receive impulses to energise the solenoids.

Referring to the drawings, the de-coding unit comprises five bars 10, Fig. 1, supported by fixed upright member 11, 12, for lengthwise sliding movement. The bars 10 are provided with vertical slots with which co-operate pins 13 carried by vertically movable testing members 14 of which one 14a is shown in the actuated position thereof in Figures 1 and 3.

In the embodiment of the invention illustrated in Fig. 1, the four uppermost bars are code bars arranged, as indicated in Fig. 1, according to the well-known 1-2-4-8 code, and the lowest bar, indicated as X, is one which is provided as being indicative of data other than a digit

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according to the 1-2-4-8 code, for example when the decoding unit is applied to a machine operating with sterling amounts the bar indicated as X may be representative of tens-of-shillings.

In Fig. 1 the code bars 1-2-8 are shown in the normal, inactive, positions thereof and the code bar 4 is shown in its active position. Movement of the bars 10 from the inactive to active positions thereof is effected simultaneously by actuating means shown in Fig. 1 as triangular plates 15, a plate 15 being provided for each bar 10 and pivoted at 16 to a fixed frame plate 17. Movement of the plate 15 about the pivot 16 is simultaneous under the control of an operating member 18 supported for vertical sliding movement in brackets 19. Each plate 15 is connected to the operating member 18 by a spring 20 which, when the operating member 18 is permitted to move downwards, as viewed in Fig. 1, causes the plate 15 to rock clockwise about its pivot 16 so that an abutment 21 extending from the plate 15 engages a face 22 on the bar 10 with which it co-operates thereby moving the bar to the left, as viewed in Fig. 1, towards a solenoid 23 which, as will be described below, is arranged to retain the bar in active position should the solenoid be energised at an appropriate time.

In the inactive position of a plate 15 a spring anchor pin 24 secured thereto rests against a shoulder 25 on the operating member 18 and downward movement of the operating member is effected by a rocking plate 26 which co-operates with a projection 27 on the operating member and is pivoted about the axis of a pivot pin 28. The rocking plate 26 is connected with a link 29 supporting a cam roller 30 co-operating with a cam 31 secured to a shaft 32 driven by means, not shown, from the main drive of the machine to which the unit is attached. The cam 31 is so constructed that when it is operated to move the operating member 18 downwards, against the action of a spring 33 connected thereto, it moves the operating member downwards until there is a clearance between the spring anchor pins 24 and plates 15 and the shoulders 25 on the operating member. By this means it is ensured that the abutments 21 on the plates 15 have each moved their bar 10 into positive engagement with the pole of the solenoid 23 which co-operates therewith.

Each bar 10 has connected thereto an armature 34, the armature being so connected to the bars as to be self-aligned with respect to the pole of the solenoid 23 when it is moved into engagement therewith. To this end the armature 34 is supported on a split pin 35 to be freely movable on the pin, and the pin itself is located in a slot, not shown, formed in the bar to facilitate free movement of the armature and ensure the self-aligning movements thereof. To the head of the split pin 35 is connected one end of a spring 36, the other end of the spring being anchored to the fixed upright member 11. The spring 36 acts as a restoring element to restore the bar to the inactive position thereof in the event that, on presentation of the bar to the solenoid co-operating therewith, the solenoid is not energised or, alternatively, when the solenoid is energised to permit return of the bar to the inactive position thereof on de-energisation of the solenoid.

It will be understood that on many occasions not all of the bars are, at one time, required to be retained in the active position thereof and accordingly the solenoids 23 are selectively energised by apparatus forming no part of the present invention but which comprises part of the machine to which the decoding unit is attached. Thus, it may be assumed that the machine to which the unit is attached is a multiplying machine and that the de-coding unit is controlled by the read-out mechanism from the multiplying apparatus, the testing elements 14 being employed, in known manner, to provide impulses to set up a punching mechanism which will punch the de-coded result in a statistical record card.

Fig. 6 illustrates diagrammatically a circuit whereby energisation of a solenoid 23 is effected, it being understood that a similar circuit if provided for each of the solenoids. Referring to Fig. 6, R represents a part of a register in which the result of a multiplication operation performed by the calculating apparatus for the machine is set up and a reading-out operation is controlled by a

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read-out switch RO which is cam-operated from the main shaft, not shown, of the machine. When the switch RO is closed an impulse passes from the register R through a triode PT to a lead L, Figs. 1 and 6, to energise the solenoid 23. The pulse along line L from register R is, however, of short duration and accordingly, to ensure that the solenoid 23 remains energised for the required interval of time, there is provided a hold-on switch which is also cam-operated from the main shaft of the machine. Thus it will be seen from Fig. 6 that should the solenoid 23 be energised as the result of a reading-out operation, the switch HS will operate to retain the solenoid 23 energised until the control cam again opens the switch HS.

The timing of the cam for the read-out switch RO in relation to cam 31 is such that the armatures 34 are all positively engaged by the solenoid poles before the read-out switch RO permits energisation of the solenoids 23. Accordingly these solenoids which are energised will retain the bars 10 engaged thereby in their active positions when the cam 31 restores the operating member 18, and the bars 10 which are co-operating with any solenoids not energised will be restored to their inactive positions by their restoring springs 36. It will be understood that when, at the appropriate time, the hold-on switch HS is opened those bars which have been retained in the active positions thereof will be released by their solenoids and that they too will then be restored to their inactive positions by the spring 36 co-operating therewith. It will, of course, be understood that the construction of the solenoids is such as to reduce residual magnetism to a degree such that the springs 36 will overcome it or, as is well understood in the art, means may be provided to eliminate residual magnetism.

After selection of the bars 10 has been effected by the solenoids 23, the testing members 14 are moved downwards to perform the testing operation. Prior to the testing operation the testing members 14 are retained in the inactive positions thereof by a restoring bar 37 secured to an actuating plate 38, Fig. 2, for movement therewith. The testing members 14 are each provided with a pin 39, Fig. 4, which is engaged by the top of the restoring bar 37 during the restoring action thereof.

Movement of the actuating plate 38 is effected by a bell crank 40, Figs. 1 and 2, pivoted at 41 to the fixed frame plate 17, the bell crank 40 carrying a roller 42 which is engaged by a slide 43, Fig. 1, to which is connected a link 44, the link being also connected to a rocking arm 45 secured to a pivot pin 46 to which pin is also secured an arm 47 carrying a roller 48 co-operating with a cam 49 on shaft 32. Movement of the slide 43 to the right, as viewed in Fig. 1, rocks the bell crank 40 thus moving downwards the actuating plate 38 so that the restoring bar secured thereto is also moved downwards and the testing members 14 tend to follow the movement of the plate 38 due to the action of springs 50, Fig. 2. Except, however, where the pins 13 on testing member 14 encounter a free passage provided by slots in the bars 10, as indicated by the pins 13 on the restoring bar 14a, Fig. 1, the pins 13 will be arrested by the upper edges of the bars 10.

Each testing element 14 is provided with an abutment 51, Figs. 3, 4 and 5, and as can be seen from Fig. 3, the abutments 51 on elements 14 which have been arrested by the upper edges of bars 10 will be disposed in a position above that of an abutment 51 on an element such as 14a which has been moved by its spring 50 into a free path defined by slots in the bars 10. The springs 50, do not, however, operate to move the element 14 to its full downward extent, this being effected positively by a plate 52 pivoted on a spindle 53 and sprung inwards towards the testing elements 14 by a spring 54, Fig. 2. The spindle 53 is movable in vertical slots 55 formed in stop plates 56 carried by the plate 38 and is urged against the lower edges of stop plates 156 by springs 57, Figs. 1 and 5. On the downward stroke of the plate 38 the spindle 53 is moved downwards by the plate and adjustable stops 53 ensure that the plate 52 is not disengaged from driving engagement with abutments 51 as shown in Fig. 3.

When the plates 38 and 52 are restored to their upper or starting positions, the ends of the spindle 53 are engaged by adjustable stops 59, Figs. 1 and 5, which ensure that when the plates are fully restored the spindle 53

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supports plate 52 in the position shown in Fig. 5, in which position the returned portion of plate 52 is retained just below the level of the tops of the abutments 51. Accordingly, when, as described above, selection of abutments is effected for driving relation with plate 52 only the selected abutments are moved to a position slightly in advance of the plate and the plate 52 can effect driving relation therewith as shown in Figs. 3 and 4, and continued downward movement of the plate 38 causes the conditioned testing element 14, through plate 52, positively to be moved downwards to impart an impulse which is to operate the set-up mechanism to control the punching of a result in the card.

We claim:

1. A decoding unit comprising a plurality of code bars supported for movement to and from inactive position thereof, testing members co-operating with and movable relative to said code bars to effect decoding according to the arrangement of code bars retained in the active positions thereof, actuating means for each code bar to effect movement thereof from the inactive to the active position thereof, a solenoid for each said code bar and having a pole to co-operate with the bar when the bar is in its active position, circuit means to energise said solenoids to retain in active position the code bars co-operating therewith, a restoring element for each said code bar to restore it to the inactive position thereof on non-energisation of the solenoid co-operating therewith, and an operating member common to all said actuating means to effect simultaneous movement of all said code bars from the inactive to the active positions thereof.

2. A unit according to claim 1, wherein each said actuating means comprises a pivoted plate, an abutment carried by the plate to engage the code bar appropriate thereto, and a spring connecting the plate to said operating member to effect pivotal movement of the plate on actuation of the operating member thereby through said abutment effecting movement of the code bar from the inactive to the active position thereof.

3. A unit according to claim 2, including a cam to actuate said operating member, and linkage connecting the cam and operating member thereby to effect movement of the operating member to a position beyond that at which said springs have completed rocking of said pivoted plates to move the code bars into co-operation with their solenoids and so ensure proper co-operation between the code bars and solenoids.

4. A decoding unit comprising a plurality of code bars supported for movement to and from an active position thereof, a self-aligning armature carried by each said code bar, testing members co-operating with and movable relative to said code bars to effect decoding according to the arrangement of code bars retained in the active positions thereof, actuating means for each code bar to effect movement thereof from the inactive to the active position thereof, a solenoid for each said code bar and having a pole to be engaged by the armature carried by the bar when it is in its active position, circuit means to energise said solenoids to retain in active position the code bars co-operating therewith, a restoring element for each said code bar to restore it to the inactive position thereof on non-energisation of the solenoid co-operating therewith, and an operating member common to all said actuating means to effect simultaneous movement of all said code bars from the inactive to the active positions thereof.

5. A unit according to claim 4, wherein each said actuating means comprises a pivoted plate, an abutment carried by the plate to engage the code bar appropriate thereto, and a spring connecting the plate to said operating member to effect pivotal movement of the plate on actuation of the operating member thereby through said abutment effecting movement of the code bar from the inactive to the active position thereof.

6. A unit according to claim 5, including a cam to actuate said operating member, and linkage connecting the cam and operating member thereby to effect movement of the operating member to a position beyond that at which said springs have completed rocking of said pivoted plates to move the code bars into co-operation with their solenoids and so ensure proper co-operation between the code bars and solenoids.

References Cited in the file of this patent

UNITED STATES PATENTS

2,045,437

Daly June 23, 1936