July 24, 1951 E. BENNINGER 2,561,646

SETTING DEVICE FOR THE TYPE LEVERS IN CALCULATING MACHINES

Filed June 24, 1948 2 Sheets-Sheet 1

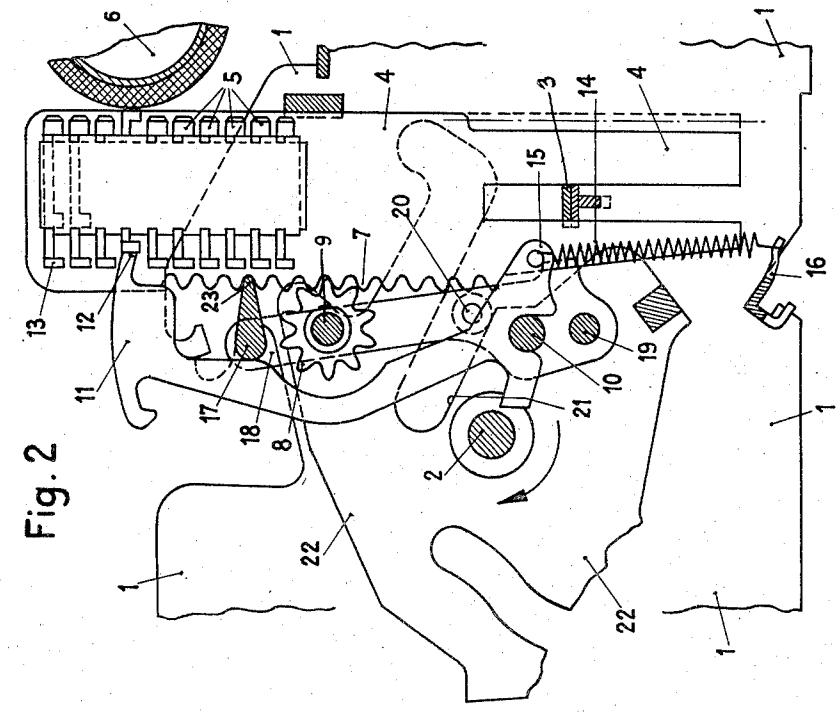


Fig. 2

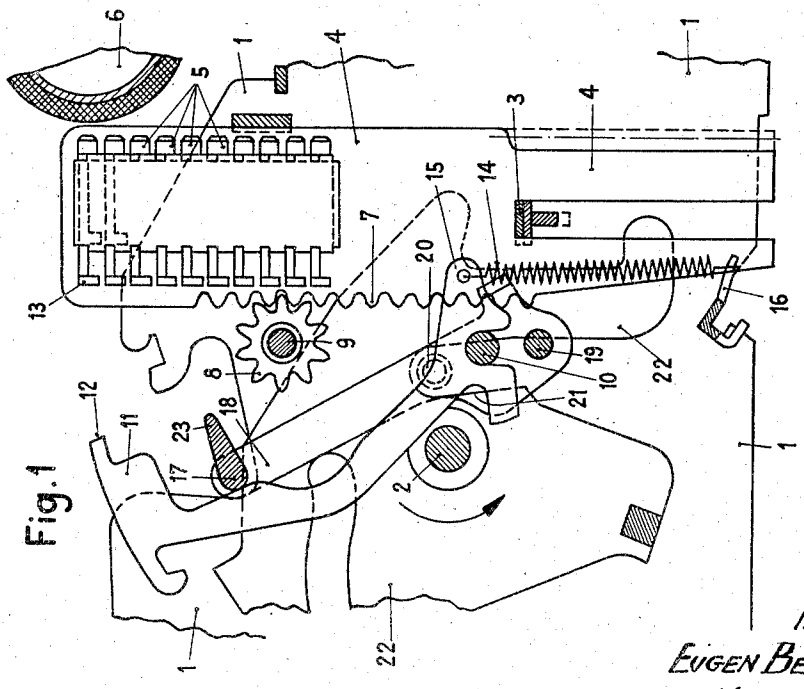


Fig. 1

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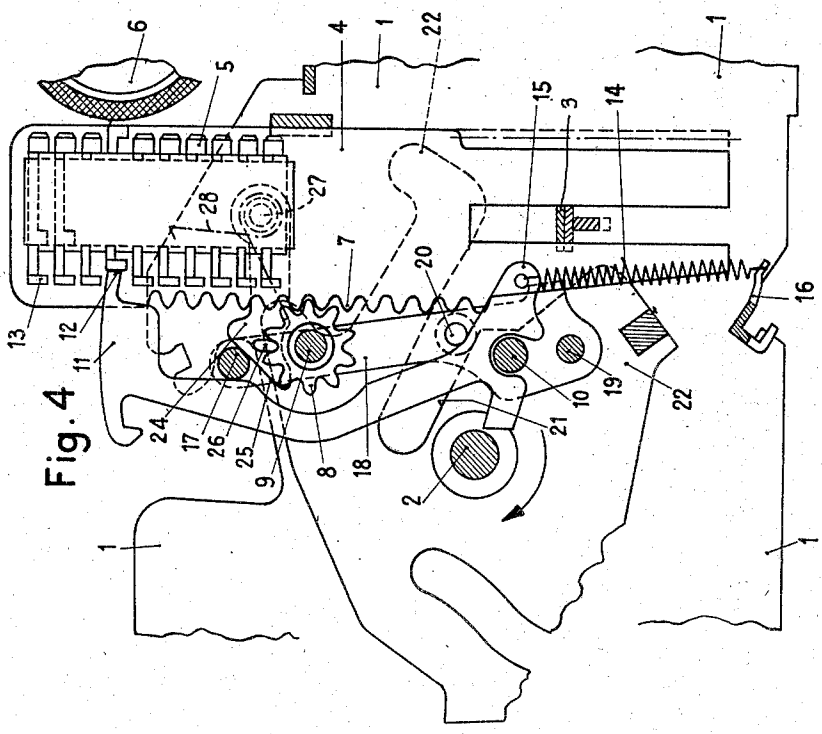


Fig. 4

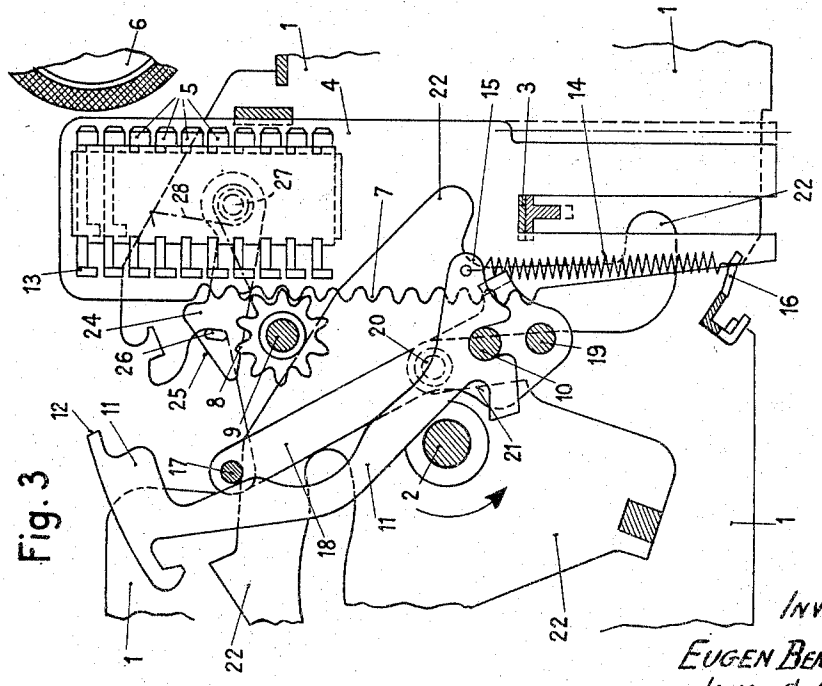


Fig. 3

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SETTING DEVICE FOR THE TYPE LEVERS IN CALCULATING MACHINES

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3 Claims. (Cl. 101—93)

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In the operation of certain calculating machines, for instance of the well known ten-key calculating machines, it is usual first to set the type carriers relatively to reciprocable hammers according to the figures to be printed, and, then to impel the hammers against the selected type elements to effect the printing. Generally, for the purpose of setting the type carriers the latter are provided each with a rack which meshes with a pinion on the side opposite the printing platen. The hammers are driven by a control element, and are brought back to their initial position by means of a separate hammer return rail.

If, in such a conventional machine, the pinions and the racks of the type carriers are somewhat worn or have play for some other reason, it may happen that the printed numerals do not appear in a perfectly horizontal line, but are displaced in height with respect to each other. The present invention aims to eliminate or at least to minimize the mentioned drawback, and to provide very simple means whereby a fine adjustment of the type carriers can be effected. It is an object of the invention to provide an adjusting means, such as a rail, adapted to engage in the driving means of the type carriers so as to insure accurate setting thereof. In its preferred form, the adjusting rail is combined with a conventional hammer return rail. This has the advantage that no additional means are required. According to another form of the invention, the adjusting rail may be mounted on arms operative by a hammer-return means to cause engagement of the adjusting rail with the pinions of the type-carrier drives.

Further objects and details of the invention will be apparent from the description given hereinafter, and the accompanying drawing, illustrating two embodiments thereof by way of example. In the drawing—

Figs. 1 and 2 illustrate a first embodiment and Figs. 3 and 4 a second embodiment in diagrammatic representation and with the different parts in various positions.

Figs. 1 and 3 show the two embodiments with parts in the initial position, whilst Figs. 2 and 4 show the parts in the operative position of the hammers. In the illustration, only the parts necessary for understanding the invention are shown; the other parts, known per se, are not further explained.

In all figures, the numeral 1 designates a wall of the frame. 2 is a shaft journaled in the two frame walls, and 3 a cross rail also supported

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by the frame walls. Type carriers 4 are mounted on rail 3 and can be shifted relatively thereto in the vertical direction. The type carriers contain the ten type plungers 5, which are urged in the position illustrated in Figs. 1 and 3 by springs not shown against the restraint of such springs, the type plungers can be moved forward and caused to impinge against the platen 6. Each carrier 4, on the side opposite the platen 4, is provided with a rack 7 which co-operates with a pinion 8. The pinions of the different racks 7 are mounted on a transverse shaft 9, which is rotatably supported in the frame walls. Other means, conventionally combined with the pinions 8 in machines of the type under consideration are not illustrated in the drawing. It is sufficient to say that the pinions 8 serve and are adapted to displace the rack 7 vertically according to the numeral to be printed. On a transverse shaft 10, the hammers 11 are mounted so as to cooperate, with their front faces 12, with the anvil surfaces 13 of the type plungers 5. Each hammer 11 is provided with a tension spring 14, one end of which is attached to an arm 15 of the hammer and the other end engages in a bentdown lug 16 of the frame wall 1. This spring tends to rotate the hammer 11 clockwise. A return rail 17 bears against the front side of the hammers and is attached to a lever 18. This lever is rotatable about a cross shaft 19 and projects with a pin 20 into a control slot 21 of a control element 22 seated on the shaft 2. When the control element 22 is turned in the direction of the arrow in Fig. 1 by means not shown, the lever 18 will be moved forward, whereby the hammer 11 is freed to impinge against the selected type-plunger 5. In accordance with the invention, an adjusting rail 23 is provided which in the embodiment of Figures 1 and 2 is in one piece with the hammer-return rail 17. In the forward position of lever 18, the adjusting rail 23 engages in grooves of the racks 7 which are raised according to the selected numerals. Thereby, rail 23 will exactly align the registering grooves and, consequently the type plungers so that the printed numerals all appear on one line.

Fig. 2 shows the parts in the printing position. Immediately before the blow of the hammer 11, the adjusting rail 23 have moved into one of the tooth gaps of each of the type carriers 4, so that any difference in height is equalised.

Figs. 3 and 4 show a modified embodiment in which the adjusting rail does not directly engage in the racks 7 of the type carriers. In

this embodiment, the return rail 17 cooperates with arms 24 pivotably supported at 27 on both sides of the type carriers. These arms 24 are provided, on their sides facing rail 17, with a wedge-shaped running-up surface 25 and are also provided with a spring 28 (indicated by a dash and dot line to avoid overcrowding of the drawing) which tends to turn the arms in a clockwise direction. An adjusting rail 26 is secured to the arms 24. Thus, when lever 18 is turned in the clockwise direction, rail 17 will engage the surfaces 25 and the adjusting rail 26 arranged on the plates 24 will be pressed into the tooth gaps of the pinions 8. Thereby, the latter will be accurately aligned with respect to each other, and, consequently, the selected type-plungers too, so that solely the play between the pinions and the racks, which as a rule is slight, could cause a negligible inaccuracy.

What I claim as my invention and desire to secure by Letters Patent, is:

1. In a calculating machine of the character described including type carriers, type plungers carried by said carriers, reciprocable hammers to operate selected ones of said type plungers, a pinion and rack gear in connection with each of said type carriers for shifting said carrier with a selected type plunger in the path of the coordinate hammer, and wherein a common reciprocable means is effective to return the hammers after an impelling movement to their initial positions; the combination with said common means of a reciprocable member extending transversely with respect to said carriers and having an edge shaped according to the cross-section of the gap between adjacent teeth of one of the parts of said gears, means to guide said member in a path so as to engage with said edge into registering gaps of said parts of said gears, and means in connection with said common means and said member to cause engagement of the latter with said gear parts when said common means moves in the direction opposite to that for returning said hammers.

2. A device as claimed in claim 1 wherein said common means is a rail having a first edge for engagement with said hammer, said member being constituted by the portion of said rail opposite said first edge and including a second edge adapted to engage into registering gaps of said racks.

3. A device as claimed in claim 1, wherein said member is in the form of a rail having an edge of a cross-section according to the gap between adjacent teeth of said pinions, further comprising a pair of arms to which said rail is secured, said arms being so pivoted as to guide said rail in a path to engage into registering gaps of said pinions, resilient means connected to said arms and tending to turn said arms in a direction to disengage said rail, and said arms including faces in the path of said common means, whereby said arms will be turned by said common means to cause engagement of said rail with said pinions on a movement of said common means opposite to that for returning said hammers.

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