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ACCOUNTING MACHINE WITH A TRANSVERSE BALANCING MECHANISM FOR POSITIVE AND NEGATIVE SUMS AND ACCUMULATING MECHANISMS, OF WHICH EVERY TWO DIFFERENT ONES, I. E., ONE FOR POSITIVE AND ONE FOR NEGATIVE LINE TOTALS, ARE COORDINATED TO A PREDETERMINED COLUMN

Filed Dec. 8, 1939

Serial No. 308,260

4 Sheets-Sheet 1

Fig. 1

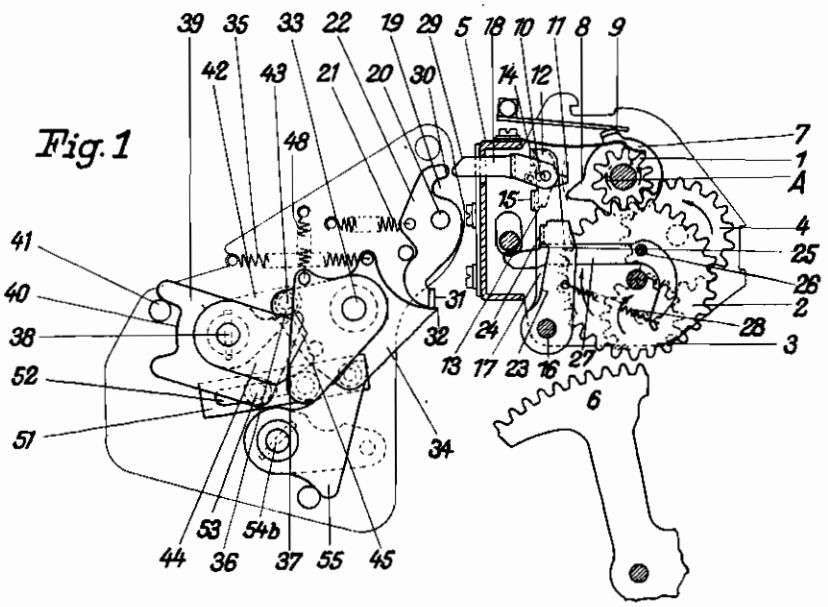


Fig. 3

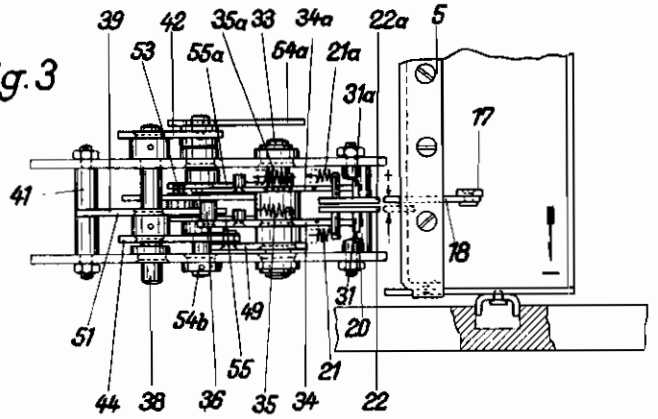


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Fig. 2

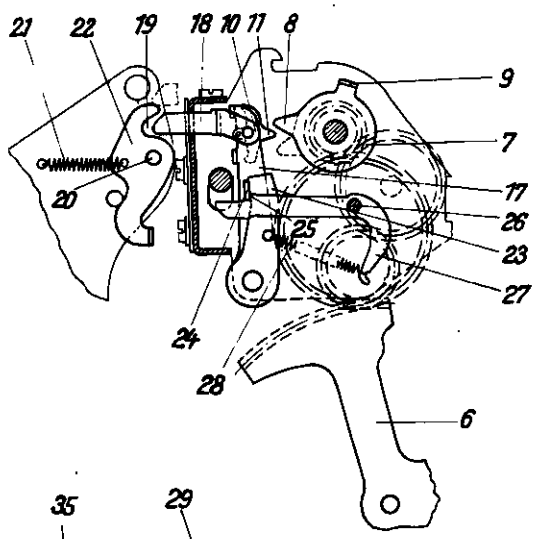


Fig. 4

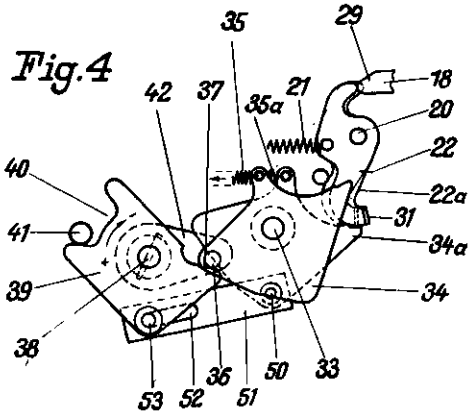


Fig. 6

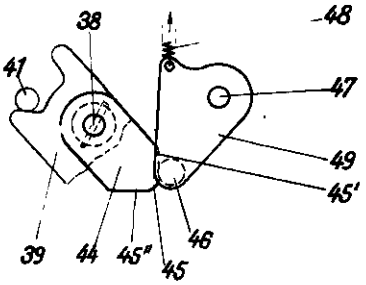


Fig. 5

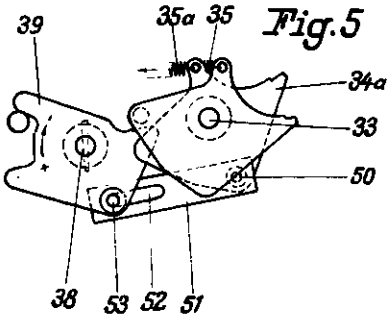


Fig. 7

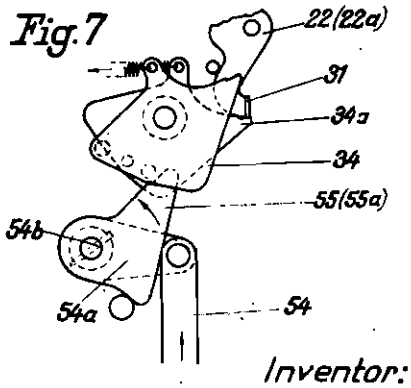


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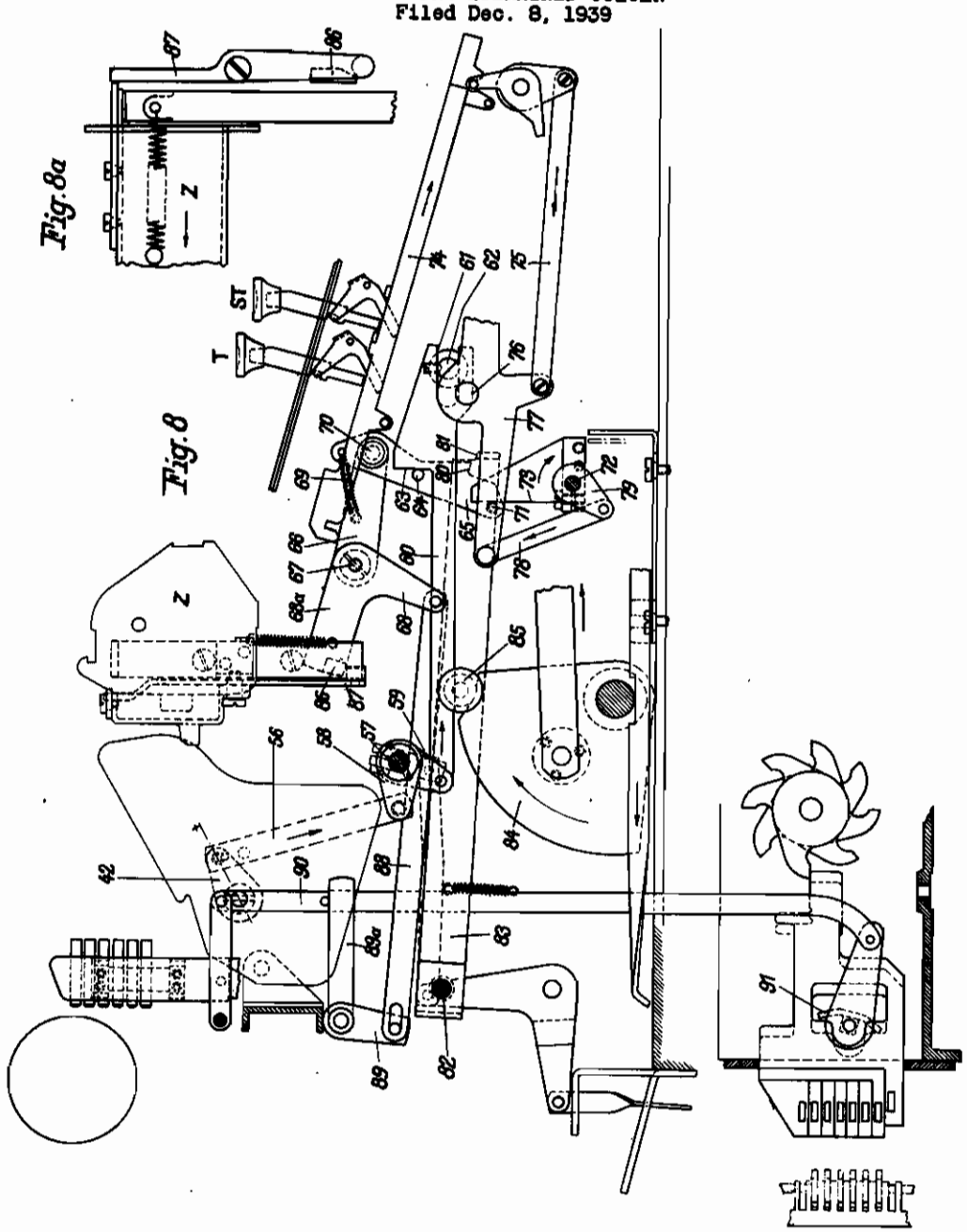
Fig. 8a

Fig. 8

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4 Sheets-Sheet 4

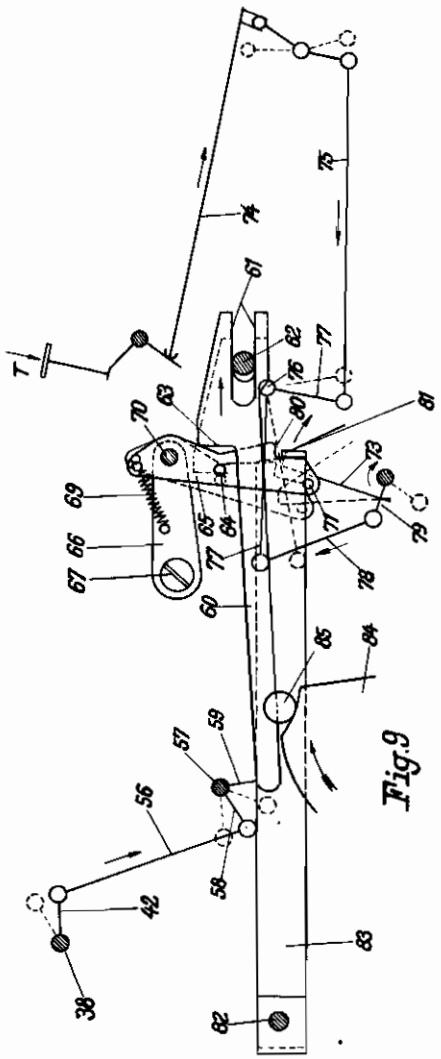

Fig. 9

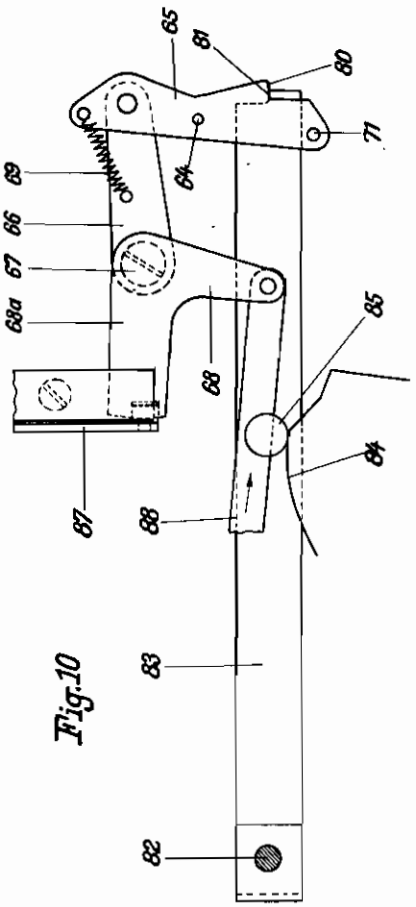

Fig. 10

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# ALIEN PROPERTY CUSTODIAN

## ACCOUNTING MACHINE WITH A TRANSVERSE BALANCING MECHANISM FOR POSITIVE AND NEGATIVE SUMS AND ACCUMULATING MECHANISMS, OF WHICH EVERY TWO DIFFERENT ONES, I. E. ONE FOR POSITIVE AND ONE FOR NEGATIVE LINE TOTALS, ARE COORDINATED TO A PREDETERMINED COLUMN

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Application filed December 8, 1939

The machine according to the invention belongs to the class of accounting machines with a transverse or balancing mechanism for positive and negative totals and with accumulating counting mechanisms, the stepwise adjustment of which takes place when the carriage jumps from one column to another column.

It has already been proposed, to coordinate to the individual columns two accumulating mechanisms for plus- and minus amounts, especially to the balance column two accumulating mechanisms for plus- and minus line totals. In this known construction the accumulating mechanism for plus- or the accumulating mechanism for minus line totals is actuated in dependency on the subtraction control of the balancing mechanism (feeding by minus balance lever). This requires especial attention at the attendance or the arrangement of a separate control of the balancing mechanism in such a manner that in dependency on the known circular feeding, i. e. at backward carrying over of a tens feeding moving through the highest place of this balancing mechanism upon the unit place, the total key is locked, so that the subtraction feeding element (minus balance lever) has first to be actuated in order to feed minus-total.

According to the present invention a new way is proposed for the selection of the two accumulating mechanisms for positive and negative line-totals, which mechanisms are coordinated to the line-totals, and this way makes this selection absolutely independent on the manipulation and thereby on the attention of the person who attends to the accounting machine and carries the same out positively in a correct manner.

This is attained according to the invention in that the engaging of the two accumulating mechanisms for positive and negative line-totals takes place exclusively in dependency on the well known circular feeding of the balancing or transverse mechanism. In the accounting machine according to the invention there are consequently provided:

*a*. A selecting device for the accumulating mechanisms so that to every column an accumulating mechanism is coordinated; to the line-total column (balance column), however, two accumulating mechanisms are coordinated, one for the positive and one for the negative balances,

*b*. The subtraction control for the balancing mechanism adapted to be adjusted by the paper carriage or by hand,

*c*. An additional negative feeding for the totalising in the balaneing mechanism, this feeding being automatically adjusted by the movement of the balancing mechanism (circular feeding),

*d*. A separate control for the change of the accumulating mechanisms in the balance column, which is also automatically controlled by the operation of the balancing mechanism, i. e. the circular feeding, and in such a manner that, each time the negative circular feeding has been passed through, the second single counting mechanism coordinated to the balance column is automatically selected.

In order to carry out automatically these different proceedings in dependency on the circular feeding, the circular feeding gear is not, as usual, constructed so that the tens feeding is effected directly from the highest place of the balancing mechanism to the unit place, but in a special manner so that from the tens feeding in the highest place the feeding in the unit place is merely prepared, and by releasing of a pawl, which in turn liberates a separate spring tensioning mechanism. This spring tensioning mechanism then carries out during the calculating operation the tens-feeding in the lowest place, the reversing of the transverse- or balancing-mechanism into the subtractive position and the change of the accumulating mechanisms in the balance column. Hereby is avoided that the circular feeding is made more difficult, and a sufficient power for the rapid reversing of the balancing mechanism and for the change of the accumulating mechanisms is produced.

In the accompanying drawings embodiments of the invention are illustrated by way of example.

Figs. 1 to 7 show the special means of the circular feeding,

Figs. 8 to 10 show the reversing device for the balancing mechanism and for the changing of the accumulating mechanisms.

### I. *The special kind of the circular feeding*

Fig. 1 shows in elevation the fundamental position of the counting mechanism and of the elements carrying out the circular feeding,

Fig. 2 an elevation of the gear after the passage of a tens feeding through the highest place of the transverse mechanism and prior to the swinging out of the counting mechanism from the feeding mechanism segments,

Fig. 3 a top plan view of Fig. 1,

Fig. 4 an elevation of the position of the circular feeding gear at negative circular feeding,

Fig. 5 an elevation of the same gear at positive circular feeding,

Fig. 6 a locking arrangement for the circular feeding gear in the actual circular feeding position,

Fig. 7 the arrangement for returning the gear.

In Fig. 1 the toothed wheels of the counting mechanism are designated by 1 and driven at addition by a wheel 2, at subtraction by wheels 3 and 4. The counting mechanism is mounted in the counting mechanism frame 5 and during the calculating operation it is brought into engagement with the segments 6 of the adjusting mechanisms by being shifted in downward direction. On every toothed wheel 1 of the counting mechanisms a tens feed disc 7 with a tens feed projection 8 and with a total stop 9 is mounted. It is supposed that the counting mechanism be driven subtractively and that a tens feeding in the highest place be proceeding. The tens feed projection 8 is then turned in the direction of the arrow A from the zero position and strikes in known manner against a projection 11 of a star stop oscillatably mounted on a stationary pin 10, the arms 12, 13 of this star stop bearing against bent off ends 14 and 15 of an oscillatable tens-feed lever 17 oscillatable about pins 16 and corresponding to the highest place. The tens feed lever 17 is therefore oscillated towards the left (compare for instance the position Fig. 2) when the projection 8 passes along the stop 11 of the stop star. The tens feed lever 17 of the highest place of the counting mechanism carries a slide 18 hingedly connected with it. As the counting mechanism, during the calculating operation, had been lowered from the position shown in Fig. 1 into the position in which it engages with the segments 6 of the adjusting mechanism, the slide 18, during the oscillation of the lever 17 towards the left, engages into a notch 19 of a pawl 22 controlled by a spring 21 and oscillatable about a pin 20. The tens feed lever 17 is further rigidly connected with a notch lever 23 which, during the oscillation, engages with its angle 24 over the abutment edge 25 of a lever 27 oscillatably mounted on pin 26, so that this lever 27 under the action of its spring 28 brings its edge 25 to in front of the abutment 24 of lever 23 and securely holds this lever together with the tens feed lever 17 in the position oscillated towards the left (Fig. 2).

If then the counting mechanism, after completion of the calculating operation, is again oscillated away from the segments 6, the inclined face 29 of slide 18, which face bears against an inclined face 30 of pawl 22, pushes this pawl to the left. The pawl 22, which otherwise bears with its bent over end 31 against a notch 32 of a lever 34 oscillatable about an axle 33, now liberates this lever 34. This lever is oscillated from the position shown in Fig. 1 into the position shown in Fig. 4 by the action of a preliminarily tensioned spring 35. A projection 36 of the lever 34 presses against the abutment face 37 of a lever 39 oscillatable about an axle 38, so that this lever moves from the position shown in Fig. 1 into that shown in Fig. 4, the oscillating movement of the lever being limited by a jaw 40 and by a bolt 41 on the path of this jaw (Figs. 1 and 4).

A lever 42 is rigidly connected with the lever 36 and from a pin 43 of this lever 42 the movement is transmitted by a rod upon the feed shaft which effects

1. The tens feeding in the balancing mechanism from the highest place to the lowest place and

2. The reversing of the accumulating mechanisms in the totals column from the positive to the negative accumulating mechanism or inversely.

In order that the gear remains in the position illustrated in Fig. 4 corresponding to a negative circular feeding, another lever 44 with roof-shaped end 45 is provided which, in the position shown in Fig. 6 and corresponding to the negative circular feeding, bears with its roof face 45' against a bolt 46 of a pawl 49 oscillatable about a pin 47 and held by a spring 48 in the locking position.

In order that, when the balancing mechanism carries out inversely a circulating feeding into the positive position, a corresponding reversing takes place, a second gear 22*a*, 34*a* is provided besides the gear 22 and 34, the pawl 22*a* being displaced relative to the pawl 22 by as much as the axial feeding movement of the balancing mechanism from additive to subtractive feeding amounts to, with the result that in the additive position of the counting mechanism the slide 18 cooperates with the pawl 22*a* and thereby actuates, when the counting mechanism is oscillated out of engagement with the segments, the lever 34*a*, and through the same the lever 39 is actuated (Fig. 3).

This actuation of the lever 39 from the lever 34*a* at positive circular feeding is illustrated in Fig. 5. In this Fig. 5 the lever 34*a* is shown in the oscillated position, the oscillating being effected after liberation by spring 35*a*. A bar 51 engages on a pin 50 of lever 34*a* and a pin 53 of lever 39 engages in a slot 52 of said bar. In the initial position (Fig. 1) the pin 53 is at the right hand end of slot 52. If the circular feeding is negative, the pin 53 moves to the left end of slot 52. If then a positive circular feeding takes place, the left end of slot 52 moves the pin 53 towards the right, so that the lever 39 oscillates from the position shown in Fig. 4 into the position shown in Fig. 5. Hereafter a locking of the gear takes place again, the lever 44 bearing with its roof-shaped end 45'' from the other side against the pin 46 of pawl 49 (Fig. 6).

For returning this gear at the beginning of the next following operation of the accounting machine a bar 54 serves which is driven from the machine shaft and returns through the intermediary of lever 65 or 55*a* the feed pawl 34 or 34*a* into the initial position, in which they are kept locked by the bent off ends 31 of pawls 22 and 22*a* (Fig. 7).

Herefrom can be seen, that the pawls 22 and 22*a* have to be oscillated, without special feed work, merely by the tens feed lever of the highest place, and that then the other feeding proceedings are produced by the tension forces of the springs 35 or 35*a*.

II. *The carrying out of the tens feeding from the highest balancing work place upon the unit place (circular feeding)*

As can be seen from Figs. 1 and 8, an arm 56 fixed on an axle 57 is oscillated by the lever 42 through the intermediary of a rod 56, and thereby an axle 57 is rotated. This axle extends through the machine from the highest to the lowest calculating place and effects, by an element arranged on its opposite end, the tens feeding of the unit place.

III. *The change of the accumulating mechanism in the balance column*

In Fig. 8, the gear for this change is in its initial position,

Fig. 9 shows the gear in the position at negative circular feeding and after actuation of the total key, whereas

Fig. 10 shows the same position during the operation of the main shaft.

A crank **59** is mounted on the axle **57** and when oscillating shifts a bar **60** in the direction of the arrow in Fig. 8. The open jaw **61** of bar **60** then engages over a stationary pin **62**. An abutment face **63** of bar **60** in its initial position bears against a pin **64** of a pawl **65** which is hingedly connected to an arm **66** of a bell crank lever **68**, **68***a* oscillatable about a pin **67**. The pawl **65** which, under the action of a spring **69**, tends to oscillate about a pin **70** is locked as the pin **64** bears against the abutment face **63**. This pawl is further locked by a second pin **71** which bears against the back of an arm **73** oscillating about an axle **72**. If the jaw-bar **60** is shifted towards the right, its abutment face **63** liberates the pin **64**, so that pawl **65** could oscillate. At each circular feeding this liberating of pawl **65** takes place. However, the pawl is still locked by the pin **71** which bears against the arm **73**. If then a bar **74** is shifted by the total key T or by the subtotal key St, it actuates through a bar **75** a lever **77** oscillatable about a pin **76**, which lever **77** oscillates by means of a rod **76** a crank **79** on the shaft **72** and thereby oscillates the lever **73** to the right in the direction of the arrow. At this moment, after the circular feeding has been completed and the total or subtotal key actuated, the pawl **65** is liberated and oscillates towards the right under the action of spring **69**, so that its abutment face **80** engages over an angle **81** of a connecting rod **83** oscillatable about pin **82**. The pawl **65** is then coupled with the connecting rod **83**. This rod or its roller **85** is lifted, during the calculating operation, by a curved disc **84** and thereby lifts the pawl **65** and with it the arm **66** of the bell crank lever **68**. **68***a*.

The arm **66** of the bell crank lever **68**, **68***a* shifts the bar **86** towards the right and lifts through lever **89** and **89***a* a bar **90**, by which the change element **91** is actuated for the changing over from the accumulating mechanism for the positive amounts to the accumulating mechanism for the negative amounts.

IV. *The reversing of the balancing mechanism from addition to subtraction in dependency on the circular feeding*

The reversing of the balancing mechanism from addition to subtraction or inversely is effected by the same angle lever **68**, **68***a* (Fig. 8) in dependency on the circular feeding. At the oscillation of angle lever **68**, **68***a* (compare Section III) the wedge face **86** of arm **68***a* of the angle lever **68** drives the reversing lever **87** of the counting mechanism and shifts thereby the counting mechanism Z from the positive into the negative feed position (compare also Figs. 8*a* and 10).

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