PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Calculating Machine

I, Dr. Ing. Hans Seehase, Elsenstrasse 1, Berlin SO.36, a German citizen, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

My invention relates to improvements in calculating machines, particularly the miniature type of adding and subtracting machines. The object of the present invention is mainly to provide a low cost miniature adding and subtracting machine of a construction suitable and sufficiently lasting to withstand years of use and abuse. In machines of this type it has been common to use various colors to signify the direction of motion as well as to print operating instructions and numbers in colors. This means a more complicated and expensive production, and the colors are furthermore easily worn off or obliterated by dirt. The use of colors also prevents the use of these machines by people who are color blind. A further object of the present invention is therefore to provide means whereby indications as to direction of motion become superfluous. Another object of this invention is to provide means whereby arrangements for turning the numbers when subtracting become unnecessary. A still further object is to provide a pocket adding machine which is easily cleaned and which therefore may always be in good dependable operating condition. Further objects will be evident from the following specification and claims.

I attain these objects by means as illustrated in the accompanying drawing, in which:—

Fig. 1 is a plan view of a miniature adding machine embodying my invention.

Fig. 2 is a transverse section along the line 2—2 in Fig. 1.

Fig. 3 is a longitudinal section along the line 3—3, Fig. 1.

Fig. 4 is a plan view of one of the sliding number racks on an enlarged scale.

Fig 5 is a side view of the number rack shown in Fig. 4.

Fig. 6 is a section along line 6—6 in Fig. 4.

[*Price* 1/-]

Fig. 7 is an enlarged view of the peculiar numbers used to obtain one of the objects of the present invention.

Similar numerals refer to similar parts throughout the several view.

Referring to Figures 1, 2 and 3 which shows a preferred embodiment of my invention, 10 represents the top plate which together with the back plate 11 forms the body of the machine. To strengthen the construction each plate has a right angle bend at one end forming a closed end as shown in Fig. 3 while the top plate 10 is dovetailed into the bottom plate as shown in Fig. 2.

The top plate has slots 12 through which a pin may be projected for moving the number racks. The ends of slots 12 lead into smaller slots 13 which serve the purpose of forwarding the tens. The top plate or cover 10 is slidably connected to the bottom plate 11 and may easily be removed for cleaning. The cover has furthermore holes 14 through which the results may be read. On the cover 10 are various signs and directions such as the plus and minus (15 and 16) which may be either shown in raised letter form or may be stamped into the material of the cover. In Fig. 2 is shown in section one of the sliding number racks 17 inside the housing. Rack 17 has punched-out guide pins 18 which fit in slots 19 in the back plate 11 of the adding machine. These guide pins 18 may be conveniently located one at each end of the rack 17 as shown more clearly in Figures 4, 5 and 6.

The construction of the sliding number racks 17 is shown to enlarged scale in Figures 4, 5 and 6. The centre part of this rack is drawn into a groove 20 running over the rack from one end to another. In this groove the numbers 21 may be stamped or preferably raised from below as indicated in Fig. 6. On one side the rack 17 is punched out in sawtooth form with nine/teeth 22 for forward motion and another nine/teeth 23 for reverse motion. Between these teeth there is a square slot 24 serving for moving the number rack to zero. The other side of the rack 17 carries nineteen (19) square teeth 25 which appear in slots 13 and serve

to forward the tens. As indicated in Fig. 5 the number racks 17 are bent in a suitable arc and are made from resilient material thereby creating a desired friction between the cover 10, back plate 11 and said rack 17 to prevent undesired motions of the rack.

In using the machine for adding and subtraction the direction of motion of the number rack 17 is automatically determined by the sawtooth shape of the teeth 22 and 23. Mistakes on this account, for instance by poor eyesight, are therefore entirely eliminated.

Corresponding to the number 21 on the sliding number rack 17 there are raised or stamped numbers 26 on the one side of slots 12 on the cover 10 of the machine. To facilitate the use of the machine in subtracting operations where the opposite direction is required these numbers 26 have been designed so as to be readable as another number when read upside down. This is indicated to an enlarged scale in Fig. 7 where are shown the numerals 1 to 5. The numerals 1 to 9 will thus have the following double meaning:

Numeral	1	when	read	upside	down	represents	nine,
,,	2	,,	,,	,,	,,	,,	eight,
,,	3	,,	,,	,,	,,	,,	seven,
,,	4	,,	,,	,,	,,	,,	six,
,,	5	,,	,,	,,	,,	,,	five,
,,	6	,,	,,	,,	,,	,,	three,
,,	7	,,	,,	,,	,,	,,	four,
,,	8	,,	,,	,,	,,	,,	two,
,,	9	,,	,,	,,	,,	,,	one.

It is thus seen that each individual numeral when turned upside down represents its own complement to ten. This is still more evident when these numbers are reduced to the size used on the miniature adding machine. Other forms of numerals, for instance those used in writing long hand, may, of course, equally well be designed for the same purpose. In the drawing are shown only the numerals 1 to 5 as a rotation of 180°, as explained supra, will give the remaining numerals of the decadic system.

It is now evident that subtraction can be accomplished without any mechanical arrangements for turning the numbers as the whole machine may simply be turned upside down and the reversed numerals read in this position. Similarly the direction of motion has been uniquely determined by the use of the sawtooth shaped teeth 22 and 23.

At the bottom 11 or at the cover 10 may, if desired, be placed lugs 27 for fastening the machine in a note book or case. So as to be able to quickly determine the decimal point and places of the result lines 28 and point 29 are raised or stamped in the cover 10 as shown in Fig. 1.

It will thus be seen that there has been provided a simple, inexpensive, dependable and yet uniquely operable calculating machine, generally of a novel and valuable type, and well calculated to attain the various objects and advantages of the invention. While various particulars of description, as to materials, parts and shapings and connections and relations of parts have been hereinabove detailed, this has been done in aid of disclosing as clearly as possible an embodiment of the invention as now preferred; and it is to be understood that these can be varied, apparently widely in different applications, within the appended claims, which define the scope of protection contemplated.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A calculating machine suitable for adding and subtracting consisting of a housing comprising a top and a bottom plate, said top plate being slidable into dovetail grooves formed by the edges of said bottom plate; slidable number racks in said housing, sawtooth shaped teeth on one side of said racks for unidirectional movements, square teeth on the other side of said rack for multidirectional movements; slots and perforations in the top plate of said housing whereby said slidable number racks may be moved to desired positions as indicated by numbers on said top plate of said housing.

2. A calculating machine such as claimed in claim one where said numerals on the top plate of said housing are of a peculiar design such that when read upside down each numeral represents its complement to ten.

3. A calculating machine such as claimed in claim one where the numerals on said housing are about three quarter height of said sawtooth shaped teeth of said slidable number racks, each of said numerals being located beside said slots

adjacent to and in line with the space between two of said teeth.

4. A calculating machine such as claimed in claim one where said slidable number racks have a centrally located, longitudinally extending groove recessed into the material leaving the teeth and the main body of said rack in a plane elevated from the bottom of said housing.

5. A calculating machine such as claimed in claim one where the results numerals are stamped and raised out of the bottom of a longitudinal groove in said number racks.

6. A calculating machine such as claimed in claim one where said slidable number racks have a centrally located, longitudinally extending groove recessed into the material leaving the teeth and main body of said racks in a plane elevated from the bottom of said housing, and where guide pins are drawn out of said groove whereby said racks may be guided in straight line motion.

7. A calculating machine as claimed in claim one where said slidable number racks have a centrally located, longitudinally extending groove recessed into the material leaving the teeth and main body of said racks in a plane elevated from the bottom of said housing, and where guide pins are drawn out of the back of said groove, said guide pins being drawn in a shape which can not be mistaken for a numeral of the result and whereby said indentation formed by said guide pins may be used as an indication of the end position of said number racks.

8. A calculating machine as claimed in claim one where the tooth form of said slidable number racks is such as to determine the direction of motion when an operating member is inserted.

9. A calculating machine as claimed in claim one where said sawtooth shaped teeth are pressed against the cover of said housing forming holes along said slots for inserting the operating pin, said sawtooth shaped teeth having one side cut to an angle of about 45° while the other side of said teeth are cut at right angles to the axis of said number racks, the connection between these two sides being a wide curve.

10. A calculating machine as claimed in claim one where said slidable number racks have on one side a row of sawtooth shaped teeth one half of which are directed opposite to the other half, the space between the two opposing parts being formed as an easily recognizable rectangular slot suitable for zero setting of said racks.

11. A calculating machine as claimed in claim one where said slidable number racks have twenty notches on each side.

12. A calculating machine as claimed in claim one where said bottom plate of said housing has parallel, longitudinal slots, two for each of said slidable number racks, said bottom slots being receptacles for guide pins on the bottom of said slidable number racks and being of such length as to determine the length of motion of said slidable number racks.

Dated the 25th day of April, 1935.

Dr. ING HANS SEEHASE.

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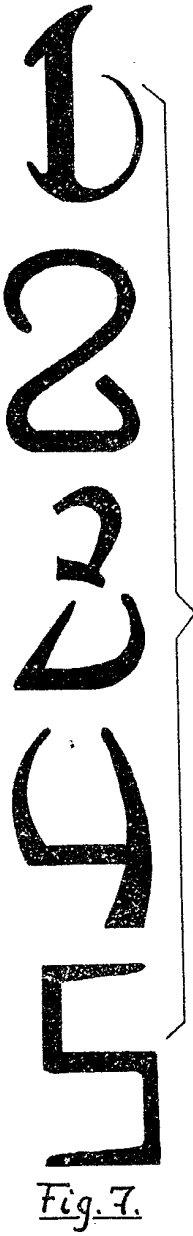

Fig. 7.

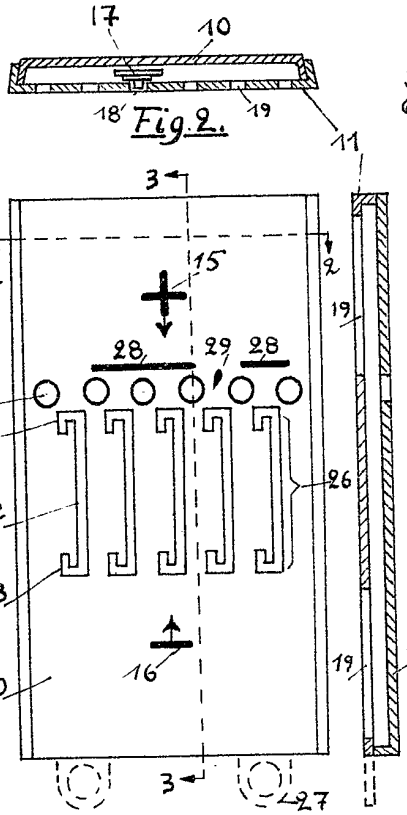

Fig. 1.

Fig. 6.

Fig. 2.

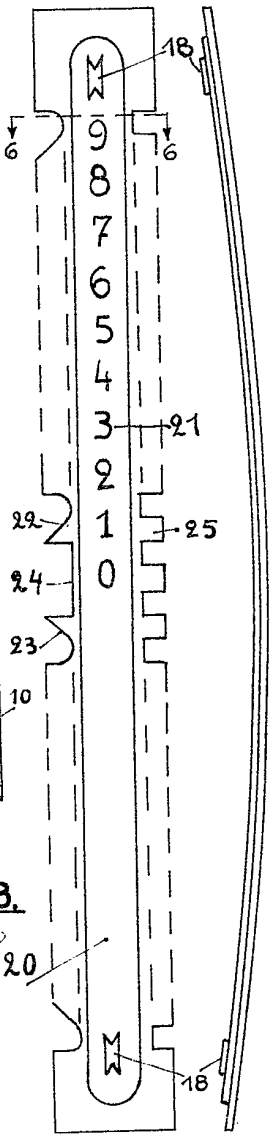

Fig. 3.

Fig. 4. Fig. 5.

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