Jan. 29, 1924. 1,482,372

T. BÄUERLE

CALCULATING MACHINE

Filed Jan. 25, 1923 2 Sheets-Sheet 1

Fig. 1.

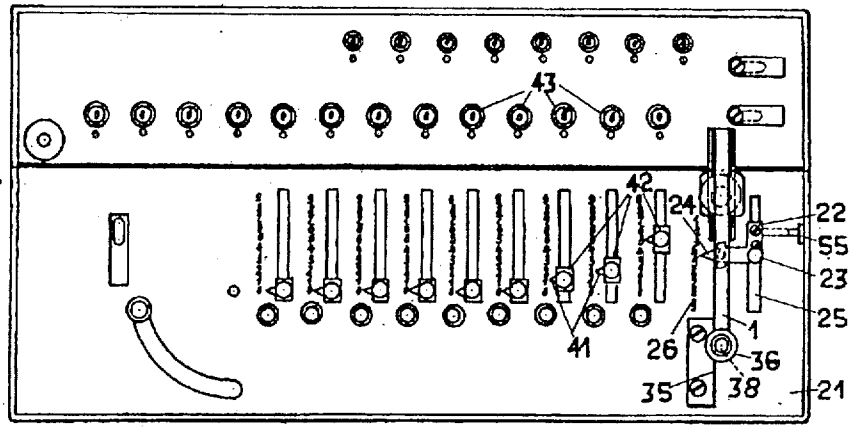


Fig. 2.

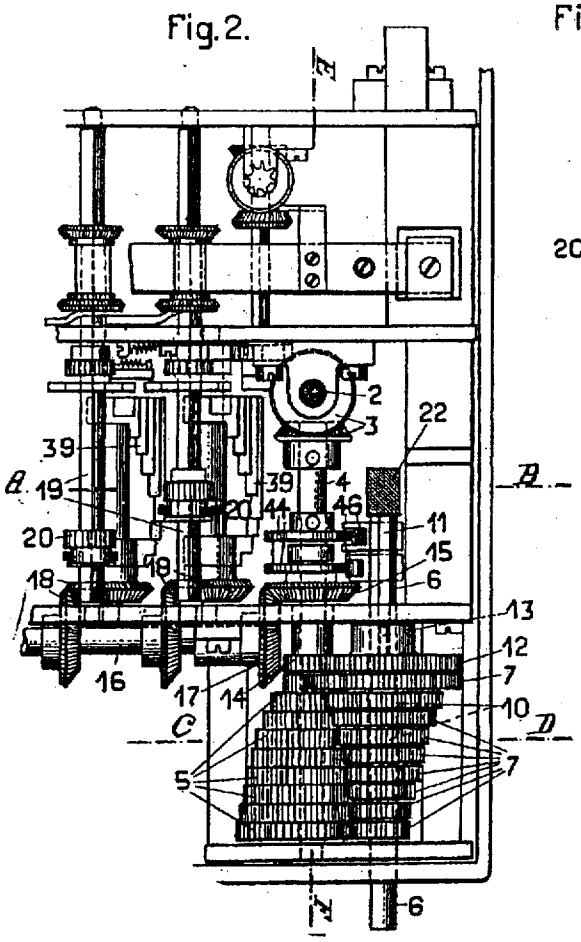


Fig. 3.

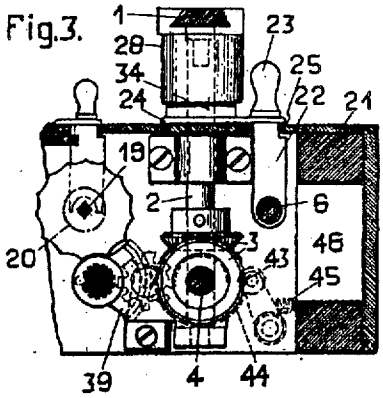
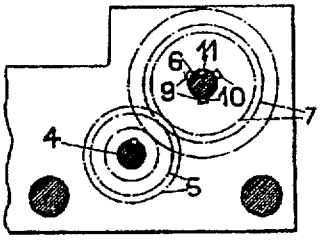


Fig. 4.



Inventor:
Tobias Bäuerle
by Thieme & Thieme
Attorneys.

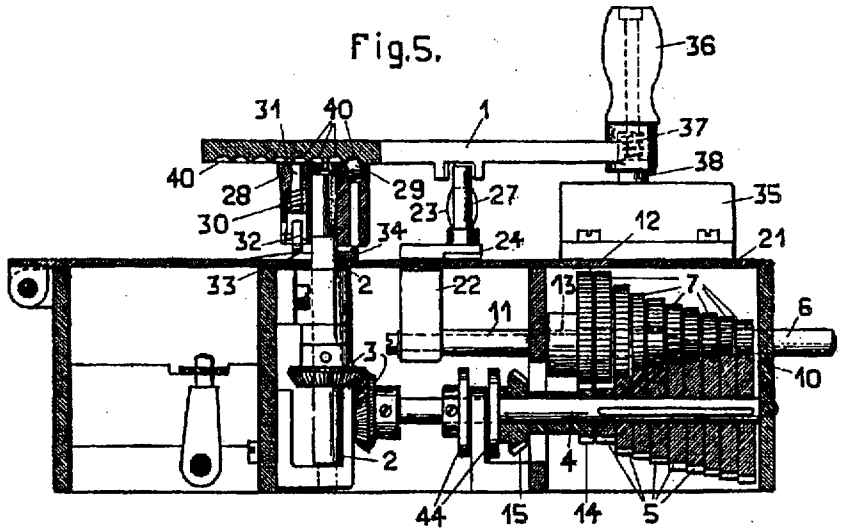
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T. BÄUERLE

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Fig.5.



Inventor:
Tobias Bäuerle
by Steinschneider
Attorney.

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UNITED STATES PATENT OFFICE.

TOBIAS BÄUERLE, OF SCHWARZWALD, GERMANY.

CALCULATING MACHINE.

Application filed January 25, 1923. Serial No. 614,832.

To all whom it may concern:

Be it known that I, TOBIAS BÄUERLE, a citizen of Germany, residing at St. Georgen Bad, Schwarzwald, Germany, have invented certain new and useful Improvements in Calculating Machines, of which the following is a specification.

My invention has reference to calculating machines of the Thomas type, and it refers in particular to means for effecting multiplications on machines of this kind in a simpler and easier manner than was hitherto possible, as ordinarily constructed machines of the kind referred to in order to effect multiplications require the driving crank to be turned as many times as there are digits contained in the multiplier which necessitates an undesirably great expenditure of time and power.

This invention is intended to obviate this difficulty by inserting a transmission gearing intermediate the driving crank and the counting mechanism, means being provided for setting the gearing to correspond to the different values of the multiplier, so as to enable the operator to carry out multiplications with a single turn of the crank.

In the accompanying drawing two modifications of a calculating machine of the kind referred to and embodying my invention are shown by way of example. In the drawings—

Figure 1 is a plan view of the machine.

Figure 2 is a plan view of a portion of the device with the covering plate removed, and on an enlarged scale;

Figures 3, 4 and 5 are sectional views on the lines AB, CD and EF, respectively of Figure 2.

Referring to Figs. 1 to 5, the shaft 2, which is operated by the crank 1, is connected by bevel gearing 3 to a shaft 4, upon which a plurality of toothed gear wheels 5 of different, stepped diameters is secured. These gear wheels are in mesh with toothed gear wheels 7 loosely mounted on the intermediate shaft 6, and arranged in the reverse order of transmission with relation to the wheels 5. The wheels 7 are provided with grooves 9 adapted for the engagement of the coupling members 10 secured to the shaft 6 and formed as keys of a length not exceeding the width of a toothed wheel, so that by the displacement of the shaft 6 only one of the gear wheels 7 is coupled to the shaft 6, which is provided, moreover, with a longitudinal groove 11 to which the transmission wheel 12 is loosely connected by means of a key 13. From the wheel 12 the movement is transmitted to the toothed wheel 14 loosely mounted on the shaft 4 and connected to the bevel gear wheel 15. From this wheel and by means of the bevel wheel 17 its shaft 16, and the bevel gear wheels 18 the square shaft 19 is operated together with the setting wheels 20 longitudinally displaceable thereon, and the setting cylinders 39 of the counting mechanism.

The longitudinally displaceable shaft 6 is rotatably connected to a sliding member 22 displaceable in a slot 25 and projecting through the cover plate 21, and provided with an adjusting handle 23 and an indicator 24 which is set in accordance with a graduation 26 provided upon the cover plate 21. The slide 22 is loosely coupled by means of a stud 27 to the crank 1 which is radially displaceable in the hub 28 keyed to the shaft 2, by means of a prismatic guide for instance. In the hub 28 a spring influenced, upwardly rounded stud 29 or the like is provided which is adapted to snappingly engage with the likewise rounded sockets 40 of the crank 1, by which means the crank bar 1 may be adjusted by steps and may be easily locked in position after each adjustment, while the displacement of the crank bar is not interfered with. On the other side of the hub 28 a stud 31 under the influence of a downwardly pressing spring 30 is mounted the said stud 31 being connected with a roller 32 adapted to move along the roller race 34, provided with the depression 33, during the rotation of the crank 1. Upon rotating the crank, starting with the initial position shown in Figure 1, the roller 32 is raised from the depression 33, which corresponds to the initial position of the parts, by which means the stud 31 is forced upwards into one of the sockets 40 provided in the crank bar, thus ensuring the locking in position of the crank bar with relation to the hub 28, so that displacement of the crank during rotation is prevented. After the rotation of the crank has been completed the roller 32 once more engages the depression 33 of the race 34, thereby causing the stud 31 to become disengaged from the crank bar 1.

On the cover plate 21 an angle piece 35 is secured which serves as a stop after each rotation of the crank. The handle 36 of the

crank 1 is movable upwards against the action of the spring 37 which pulls the handle 36 downwards and causes the extension 38 of the handle pin to place itself within reach of the angle piece 35.

If it be desired for instance to carry out the multiplication 4 times 125, the multiplier 4 is set by placing the pointer 24 upon the figure 4 on the graduation 26, or by the displacement of the sliding member 22 by means of the handle 23. By this means the shaft 6 with the coupling keys 10 is also longitudinally displaced, and the toothed wheel 7 corresponding to the transmission gearing is clutched to the shaft 6. The multiplicand 125 is then set by means of the slide 42 provided with pointer 41. After the setting of the numbers the handle 35 of the crank 1 which has been radially adjusted by the displacement of the multiplier slide 22, is raised to such an extent, until the stud 38 can move past the angle piece 35, whereupon the crank 1 is once slowly rotated, causing the product 4 times 125=500 to appear in the inspection openings 43 of the product counting mechanism (Fig. 1).

In the case of additions the slide 22 is locked in the initial position by means of a locking dog 55, by which means the transmission of the movement of the crank is effected directly to the main shaft 16 of the counting wheel which is driven by the wheel 15.

My invention may also be applied to calculating machines of the Thomas-type provided with key adjustment.

The operating crank is preferably mounted upon the cover plate 21, but it may also be arranged at the side or in front of the frame of the machine.

The clutching or coupling means described for connecting the multiplier slide 22, 27 to the crank arm 1 does not only produce the result of not interfering with the rotation of the crank, but it causes at the same time an increase or reduction of the lever arm of the crank corresponding to the increase or reduction of the power necessitated by the adjustment of the gear transmission. This results in an automatic compensating action by the larger crank arm of the lever, with the insertion of a greater gear transmission and the corresponding expense of power resulting therefrom.

Various other modifications of the principles of this invention will suggest themselves to the expert to adapt the invention to varying conditions of application, and to the convenience of the user.

I claim:—

1. Calculating machine of the Thomas type, comprising a radially displaceable driving crank, a counting mechanism, an axially displaceable intermediate shaft engageable with said driving crank, a plurality of gear wheels of different diameters adapted to be selectively coupled with said shaft and in engagement with said counting mechanism, and means to lock said crank shaft in the adjusted position.

2. Calculating machine of the Thomas type, comprising a radially adjustable driving crank, a counting mechanism, an axially displaceable intermediate shaft detachably engageable with said driving crank, a plurality of gear wheels of different diameters adapted to be selectively coupled with said shaft and in engagement with said counting mechanism, spring pressed locking means engageable with said crank shaft in the adjusted positions thereof, and coupling means for said gear wheels.

3. A calculating machine of the Thomas type, comprising a radially displaceable driving crank, a counting mechanism, a slide detachably engageable with said driving crank, indicating means on said slide, a shaft operatively connected to said driving crank, transmission gearing on said gear shaft, engageable with the counting means and gear wheels on said shaft, an axially displaceable intermediate shaft connected to said slide, gear wheels of different diameters meshing with the gear wheels on the first shaft, means for selectively coupling said gear wheels to said intermediate shaft and spring actuated locking means for locking the crank shaft in the adjusted position.

4. Calculating machine of the Thomas type, comprising a driving shaft and a radially displaceable driving crank, means for resiliently fixing said crank in several radial positions, an intermediate shaft positively connected with said crank so as to be shifted axially when said crank is displaced radially, a plurality of gear wheels of different diameters on said intermediate shaft, means for selectively coupling said wheels with said shaft, a transmission shaft and gear wheels fixed to said transmission shaft and meshing permanently with the gear wheels on said intermediate shaft, and counting mechanism in operative connection with said transmission shaft.

5. Calculating machine of the Thomas type, comprising a driving shaft and a radially displaceable driving crank, means for resiliently fixing said crank in several radial positions, means cooperating with said driving crank for locking it on its driving shaft during rotation, but releasing it after each rotation, an intermediate shaft positively connected with said crank so as to be shifted axially when said crank is displaced radially, a plurality of gear wheels of different diameters on said intermediate shaft, means for selectively coupling said wheels with said shaft, a transmission shaft and gear wheels fixed to said transmission shaft and meshing permanently with the gear wheels

on said intermediate shaft, and counting mechanism in operative connection with said transmission shaft.

6. Calculating machine of the Thomas type, comprising a driving shaft and a radially displaceable driving crank, means for resiliently fixing said crank in several radial positions, a spring actuated locking pin connected with said crank serving for locking it on its driving shaft during rotation, but releasing it after each rotation, an intermediate shaft positively connected with said crank so as to be shifted axially when said crank is displaced radially, a plurality of gear wheels of different diameters on said intermediate shaft, means for selectively coupling said wheels with said shaft, a transmission shaft and gear wheels fixed to said transmission shaft and meshing permanently with the gear wheels on said intermediate shaft, and counting mechanism in operative connection with said transmission shaft.

In testimony whereof I affix my signature.

TOBIAS BÄUERLE.