Hamann
Manuf

Operating the

Hamann Manus

Calculator

De Te We
DEUTSCHE TELEPHONWERKE UND KABELINDUSTRIE A.-G., BERLIN SO 36

German National Patents
Foreign Protection Rights

Reprint
as well as extracts prohibited

Changes in construction and design reserved

The inventor and calculator constructor Dr. Ing. h. c. Christel Hamann, known far beyond the borders of Germany, has developed the "Hamann" calculator based on his long experience in the field of calculator construction. He has based this on switching-latch-wheel operation, a new mechanical system that is patent protected at home and abroad, and which through the years has proven its superiority in various models. This is the basis for reliable operation, simple handling and the automatic operating mode that distinguish all "Hamann" calculators.

Also the simplest model of "Hamann" calculators, the small hand-crank operated "Hamann Manus," has all the features and properties required for rapid and reliable calculations on a modern manual calculator. Among the many advantages of the "Hamann Manus," the

automatic division

in particular should be emphasized. The execution of this most cumbersome of arithmetic operations has been solved in the simplest manner in this machine. The operator can easily enter the task directly into the respective registers of the machine and crank the handle. All further action for carrying out the division, like carriage movement etc., is performed by the machine itself.

As the machine may be operated by one hand only, it allows also for very fast multiplication, and through particular features of construction, it is also exceptionally well suited for addition and subtraction.

The manufacturer and general representatives would be happy to give information about the most effective procedures to solve combined tasks and especially about the usage of the automatic division for addition, subtraction and multiplication.

Some Points for Special Consideration.

One should study the large fold-out pictorial representation of the "Hamann Manus" at the end of the manual and become familiar with the numbering of the parts and operational features as listed on page 21 as well as their function.

Before carrying out any operations on the machine, read attentively the corresponding sections through to the end before proceeding to practical execution on the machine.

For operating, place the machine at a slant relative to the operator and so far from the edge of the table that the lower right arm rests comfortably on the table and the crank can be turned using the wrist only. The carriage, which is placed in the starting position 8., is moved left to its base position by pressing down the carriage release lever 9 and moving the carriage to the left. The movement of the carriage should be controlled by holding lever 9 in order to avoid that the carriage which is under spring pressure hits the stop too hard.

Oiling of the inner parts or other interfering with the mechanism is prohibited by the conditions of guarantee. Oiling and cleaning of levers and carriage should be performed by the local representative. – The machine should be taken well care of, and during periods of non-use should be protected from dust and moisture by the enclosed wax-cloth cover.

The "Hamann Manus" is equipped with various enforced locks and safety features that are activated when operating errors occur. In such cases no form of force should be used to release the locks. It is recommended to review the operations performed and to correct for those that have been executed wrongly, or carry out any steps that have been skipped.

Explanation of the Machine.

(Compare with the picture as well as numbers at the end of the booklet)

The Switch Assembly.

The switches and the system drum of the "Hamann Manus" are located in the machine housing.

Input register.
The input levers 4 appear through the slits in the rounded cover of the switch assembly. The nine-position input register 5 serves to enter multipliers, dividers, and numbers to be added or subtracted.

Input control register.
Above the input register 5 lies the corresponding register 6 which provides a straight read-out of the values entered into the input register.

Scale.
The decimal point indicator 19 which slides on the guide above the register 6, serves to facilitate set-up and to position the decimal point. The red and white caps on the input levers, as indicators for ones, tens, hundreds etc., serve a similar function.

Input.
From the beginning one should get used to entering a number with the highest position first into the input register, i.e. going from left to right, just as in writing and speaking. The correctness of the entered number may always be checked in the input control register.

For example, to enter the number 76, the 7 tens are first entered using the 2. input lever. To do this, place the thumb as a stop under the digit 7 of the 2. input slot, and pull the lever with your index finger till it touches the thumb (see illustration below). The following 6 ones are then input using the first input lever.

Clearing.	Clearing button 3 appears from the housing to the left of the decimal point rail and marked with an arrow. When depressed it may be turned either to "Add" or to "Mult."
	When the clearing button is depressed, the input levers return to the zero position.
	In the "Mult" position the input levers remain in the input position during machine operation. However, if the arrow of the clearing button points to "Add," the levers return to the zero position with every turn of the crank handle.
Position indicator.	Below left on the cover, two arrows, the white plus arrow 14a and the red minus arrow 14b, point to the digits of counter register 8. These arrows correspond to the position indicators 15a and b from the result register 7 above the positioning scale 16.
Blocking.	Close to position arrow 14a and b is the lever 18. By pressing this lever, possible blocks of the crank 12 can be released. Only in this case may the crank be turned counterclockwise when in the base position.

The Carriage.

The front, moveable part of the "Hamann Manus" is the carriage with the 8-digit counter register 8 and the 13-digit result register 7.

Base position. The base position of the carriage is defined as the position at the left stop. The position arrows 14a and b then point between counter register 8 and result register 7.

Scale. In front of the carriage registers there is a decimal guide with the decimal point indicator 19.

Thumbwheels. By using the thumbwheels 17, numbers may be entered directly into the result register 7. The thumbwheels can only be turned when they do not mesh with the system mechanism; they may therefore only be used when the carriage is in the base position and may not be turned past 9 or 0.

Clearing. By depressing the clearing lever 13a the result register 7 is cleared, and by depressing the clearing lever 13b the counter register 8 is cleared. This clearing operation may be performed in all carriage positions.

The Operating Controls.

When operating the "Hamann Manus," take care that all switches and operating controls such as crank, clearing handles, clearing buttons, toggle switches and counter control lever are in their base positions. No operating controls should be moved while the crank is being turned. An erroneous crank turn should always be carried through to the end.
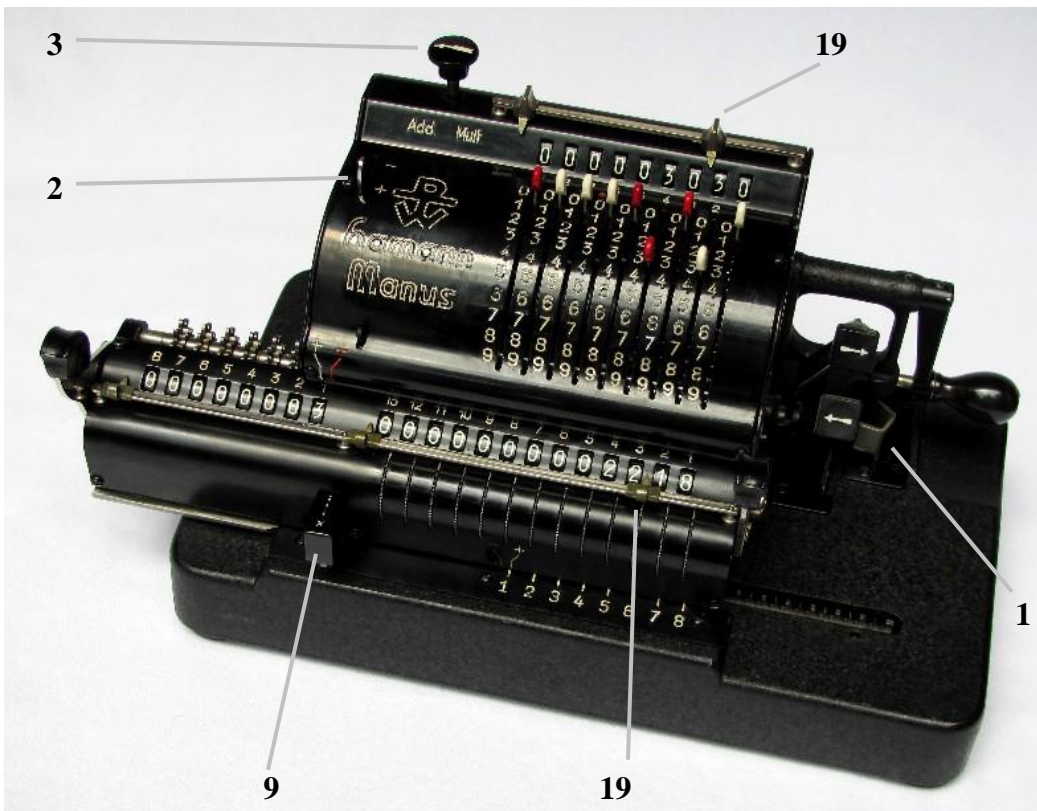
Hand crank. The crank 12, which can only be turned in one direction – clockwise –, serves to turn the system drum and snaps into the base position in the crank holder 12a.

Carriage move-ment key. When the carriage has been moved to the right, pressing the movement key 10 moves the carriage 1 step to the left. For stepwise movement to the right the movement key 11 may be used.

Carriage release. The carriage release lever 9 appears in front of the carriage cover, and pressing this lever down allows the sideways movement of the carriage by multiple positions. The lever should be held during carriage movement to avoid slippage. Corresponding to the "**:**" and "**X**" labeled arrows on the lever, the machine is switched to automatic division when the lever in the carriage (in the base position) is pushed in, while it must be pulled out for multiplication as well as addition and subtraction.

Toggle lever. The toggle 1 under the crank controls the positive or negative transfer of values from input register 5 to result register 7, depending on its positioning to "Add" or "Sub."

Counter control lever. The counter control lever 2 is turned to "+" for addition and multiplication, and to "-" for subtraction and division. Lever 2 reverses the rotational direction of counter register 8, relative to that of the result register 7, the rotational direction of which is determined by toggle 1. When the counter control lever is in the "+" position, the units rotate in the same direction, either both positive or both negative. If the counter control lever 2 is in position "-," the units rotate in opposite direction, one positive and the other negative.

Execution of the Four Types of Arithmetic.

Addition.

Example:

```
      6.34
     15.09
      0.75
     30.30
     52.48
```

Set-up of machine:
1. Toggle switch **1** to "Add."
2. Counter control lever **2** to "+."
3. Carriage release lever **9** pulled out.
4. Clearing button **3** to "Add."

Decimal point rule: When adding terms with decimals, it is always the term with the largest number of decimals that determines the position of the decimal point. The decimal point indicator **19** should be set in the input register and the result register before the addition is started.
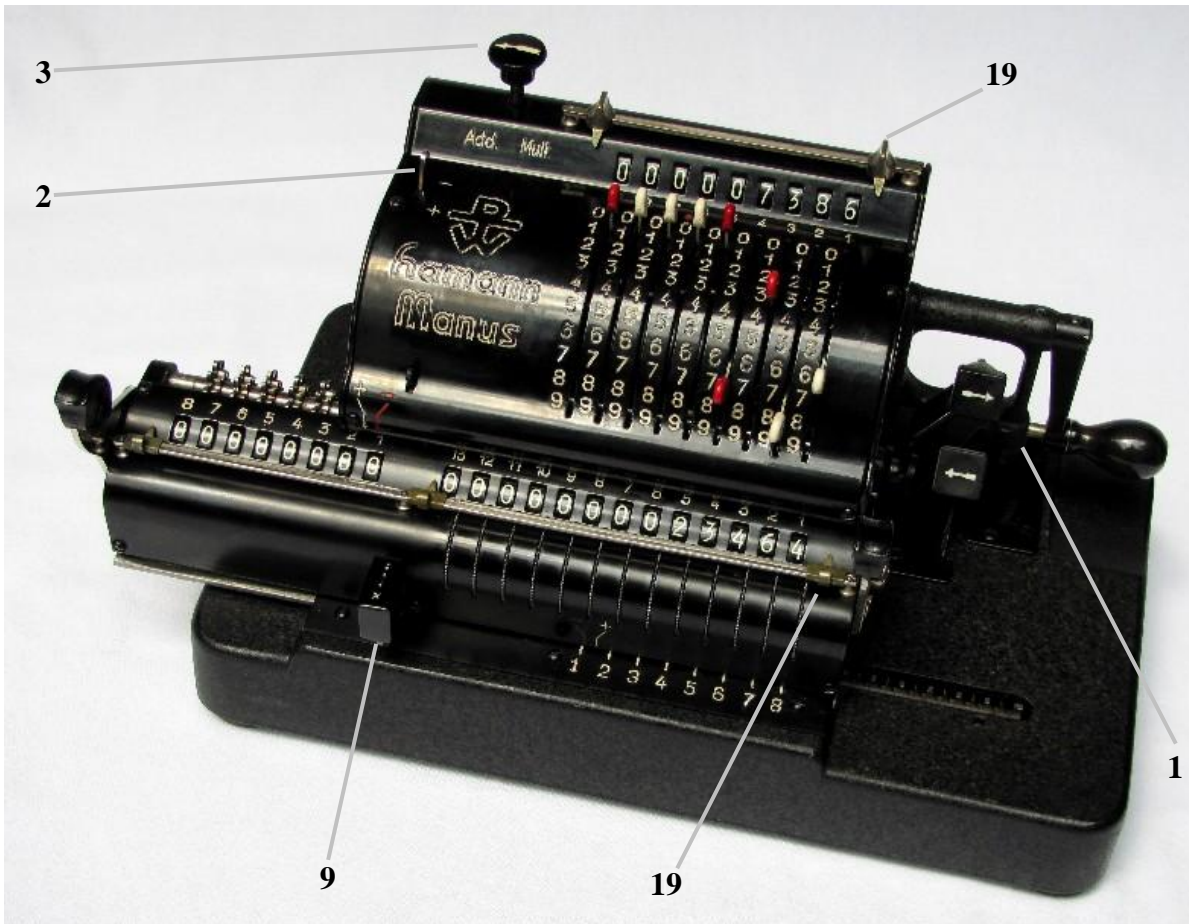
[*Translator's note: The manual speaks about "comma rule" (*Kommaregel*) in German. This is because in German a comma is used instead of a point. I have taken the liberty of referring to "decimal point" throughout. Decimal points are also used in numbers with decimals, even if these have decimal commas in the German manual. Thus the 6.34 above, appears as 6,34 in the manual etc.*]

Before every computational task one should always convince oneself that the displays show zero for all registers.

1. **After setting up the machine for addition, push the carriage movement key 11 to move the carriage from its base position to the first working position such that the plus arrow 14a as well as the plus indicator 15a point to the first position.**

2. **The first term 6.34 is entered into the input register 5 using the levers 3. – 1., and the decimal point is placed between positions 2. and 3. both in the input register 5 and in the result register 7.**

3. **After verification of the entered number in the input control register 6, the term is transferred to the result register 7 by one revolution of the crank, and thereby automatically cleared from the input register.**

4. **The following terms 15.09, 0.75 and 30.30 are then entered into the input register as described in 2. above, and then as described in 3. transferred to the result register where they are added. After transfer of the 4 terms, the sum 52.48 appears in the result register 7, and in the first position of the counter register 8, the number 4 is visible.**

5. **The carriage registers are cleared by pressing the clearing levers 13a and 13b.**

If several equal or very similar terms are added, it is advantageous to turn the clearing button 3 to "Mult," because then the input levers will remain in their positions after turning the crank, and any necessary adjustments of the levers may easily be carried out. In this case – as also for multiplication and division – the input register may be cleared by pressing the clearing button 3.

Subtraction.

Example:

```
        23464
      - 7386
      -   87
        15991
```

Set-up of machine:
1. Toggle switch **1** to "Sub."
2. Counter control lever **2** to "-."
3. Carriage release lever **9** pulled out.
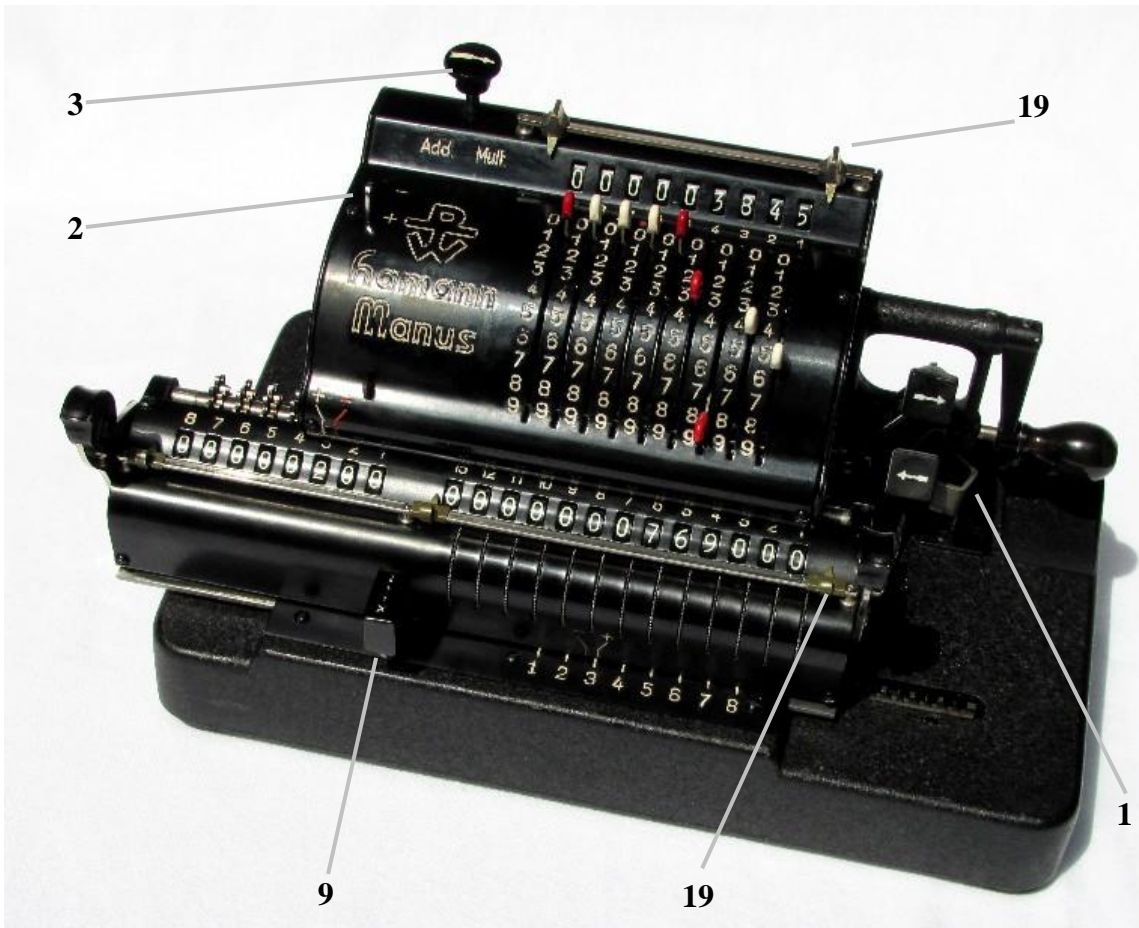4. Clearing button **3** to "Add."

Decimal point rule: For positioning the decimal point, the number with the most decimals still determines the position.

As the thumbwheels 17 of the "Hamann Manus" provide a convenient mechanism for direct setting of digits in the result register 7, these may be used to advantage also when entering the minuend [*number to be reduced*].

1. **After setting the machine up for subtraction, the minuend 23464 is entered into the result register 7 using the thumbwheels 17 for positions 5. – 1. and with the carriage in its base position.**
   The user is, of course, also free to enter the minuend into the input register 5 and transfer it to the result register 7 by a turn of the crank. In this case, however, the nines that appear in counter register 8 must be cleared.

2. **Using the carriage movement key 11, the carriage is placed in the first position, such that the minus arrow 14b and the minus indicator 15b point to the first working position.**

3. **The subtrahend 7386 is entered into the input register 5 using the levers 4. – 1. and the correctness of both the entered values is verified.**

4. **By one turn of the crank – clockwise – the minuend in the register is reduced by the subtrahend, whereby the input levers 4 automatically return to the zero position.**

5. **In the same manner the second subtrahend 87 is entered into the input register and subtracted.**
   In the result register 7 is the difference 15991, and in the counter register 8 is a 2, as two terms were subtracted.

6. **The carriage registers are cleared by pressing the clearing levers 13a and 13b.**

During addition and subtraction, if an incorrectly entered term already has been transferred to the result register, then this erroneous term should be entered again, and, for addition, subtracted using the toggle position "Sub," conversely for subtraction be added with the toggle switch to "Add." The correct term should then be entered, the toggle switch set to the position corresponding to the original operation and the value transferred.

Multiplication.

Example:

```
     3845
X    246
 945870
```

Set-up of machine:
1. Toggle switch **1** to "Add."
2. Counter control lever **2** to "+."
3. Carriage release lever **9** pulled out.
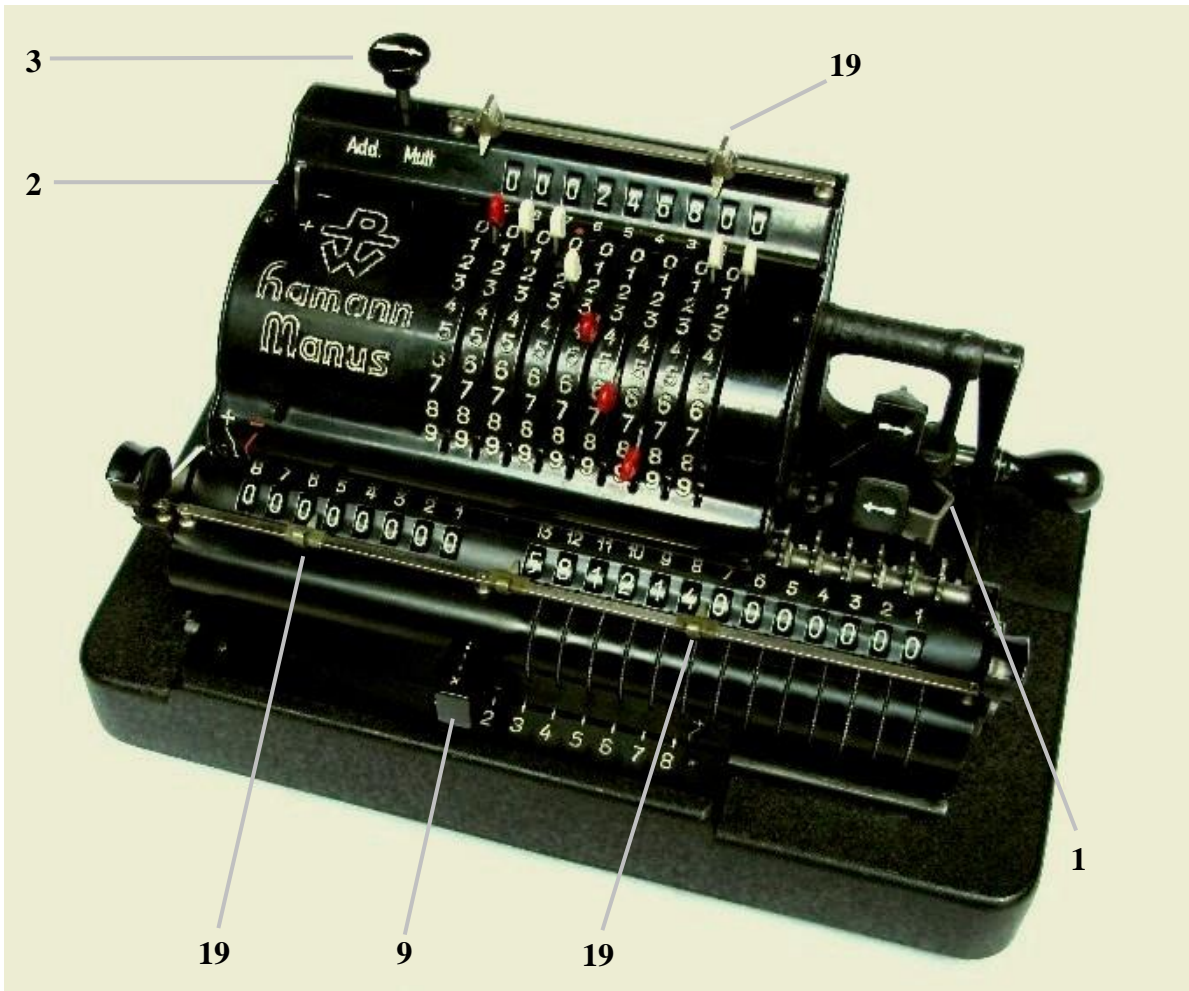4. Clearing button **3** to "Mult."

Decimal point rule: In the result register 7 the number of positions to the right of the decimal point should equal the sum of decimals in the counter control register and the input register.

For multiplication it is advantageous always to begin entering the highest digit of the multiplier into the counter control register 8, as the carriage is moved to the left by a spring.

1. **After setting up the machine for multiplication, the term 3845 is entered into the input register 5 in positions 4. – 1.**

2. **As the multiplier 246 in our example is a 3-digit number, the carriage is moved 3 positions to the right from its base position – either by using the movement key 11 or by pulling on the right clearing lever 13a – such that the plus arrow 14a and the plus indicator 15a point to the 3. working position.**

3. **By two turns of the crank the two hundreds are entered into the 3. hole of the counter register.**
   The crank handle should be pulled lightly to the right during both revolutions so that it does not enter the holder 12a. At the end of the second turn the handle is allowed to slip back into the holder.

4. **By a push of the thumb on the movement key 10, one moves the carriage to the 2. position without releasing the crank handle, and the 4 tens are entered by four turns of the crank.**

5. **After further movement of the carriage to the 1. position and the entering of the 6 ones, the entire multiplier is in the counter register, and similarly the product 945870 appears in positions 6. – 1. of the result register.**
   After short practice with multiplication one no longer visually follows the entering of the multipliers into the counter register but just listens to the rhythm of the cranking.

6. **The input register is cleared by pressing the clearing button 3, and the carriage registers are cleared by pressing the clearing levers 13a and 13b.**

In the case that one of the multiplier digits by accident is entered too many times, the excess number of turns is corrected while the toggle switch 1 is set to "Sub." – Do not forget to return the toggle to "Add" afterwards.

Automatic Division.

Example:

$$581214 : 2468 = 235.5$$

Set-up of machine:
    Toggle switch **1** is without any effect.
1. Counter control lever **2** to "-."
2. Carriage release lever **9** pushed in.
3. Clearing button **3** to "Mult."

Decimal point rule: For division the position of the decimal point for the quotient in the counter register must be determined before the beginning of the calculation for all cases, also when the calculation involves no decimals. − For the quotient which is calculated in the counter register, the decimal point is set by the following rule: In the counter register one always strikes out as many positions to the right as the difference between the number of positions behind the decimal points of the result register and the input register [*in this example strike out 7 - 2 = 5 positions*].

As the "Hamann Manus" carries out division automatically, the operator only has to enter the numbers into the machine.

1. **After setting the machine up for division, use the thumbwheels 17 with the carriage in the base position to enter the dividend 581214 into positions 13. – 8. of the result register 7 *) and set the decimal point indicator between positions 7. and 8.**

2. **The divisor 2468 should be entered to the right of the red dot on the cover, i.e. with the 6. to 3. levers of the input register 5, and likewise the decimal point be placed behind position 3.**
   According to the above decimal point rule for division, the decimal point of the counter register 8 (quotient register) should be placed between positions 5. and 6.

3. **Pull or push the carriage all the way to the right from its base position – the minus arrow 14b points to the 8. position of the counter register **) – and crank the handle with an even motion until the carriage reaches its base position or a sufficient number of digits of the quotient has been calculated.**
   The desired quotient 235.5 is built up in positions 8.- 5. of the counter register 8.

4. **The input register is cleared by pressing the clearing button 3. Clearing of the carriage registers follows from pressing the clearing levers 13a and 13b.**

The present division may be terminated after the 5. position, as there is no remainder. For other calculations any division remainder will appear in the result register.

*) Of course, the dividend may also be entered into the input register and transferred from there to the result register using the machine in multiplication mode. Care should however be taken to clear the digits either 1 or 9 from the quotient register 8.

**) If the divisor has more than 6 digits such that it occupies more than 6 positions of the input register, the carriage must only be displaced a correspondingly smaller number of positions, e.g. for an 8-digit divisor only to the minus [*indicator*] position of the 6. position.

Brief Review of the Four Basic Forms of Arithmetic.

Addition.

Machine set-up.
1. Toggle lever 1 in "Add" position.
2. Counter control lever 2 in "+" position.
3. Clearing button 3 in "Add" position.
4. Carriage release lever 9 in "out" position.

Execution:
5. Move the carriage to the working position using the movement key 11. (Plus arrow as well as plus indicator point to the 1. position).
6. Using the set-up levers 4, enter the first number into the input register 5 and check it against the input control register 6.
7. Turn crank once. – Repeat steps 6 and 7 until all numbers have been added.
8. Clear registers 7 and 8.

Subtraction.

Machine set-up.
1. Toggle lever 1 in "Sub" position.
2. Counter control lever 2 in "-" position.
3. Clearing button 3 in "Add" position.
4. Carriage release lever 9 in "out" position.

Execution:
5. Using the thumbwheels 17, enter the minuend into the result register 7.
6. Using movement key 11, move carriage to the 1. working position.
7. Enter the subtrahend into the input register 5.
8. Turn the crank to reduce the minuend by the subtrahend. – Repeat steps 7 and 8 until all the numbers have been subtracted.
9. Clear registers 7 and 8.

See illustration at the end.

Brief Review of the Four Basic Forms of Arithmetic.

Multiplication.

Machine set-up.
1. Toggle lever 1 in "Add" position.
2. Counter control lever 2 in "+" position.
3. Clearing button 3 in "Mult" position.
4. Carriage release lever 9 in "out" position.

Execution:
5. Enter the multiplicand into the input register.
6. Displace carriage to the right as many positions as there are digits in the multiplier. (Plus arrow 14a as well as plus indicator 15a point to the correct working position).
7. Crank in the highest digit of the multiplier in the corresponding counter position.
8. Push key 10 to move the carriage to the next position. (repeat 7 and 8 until the entire multiplier has been entered into the counter register).
9. Clear all registers.

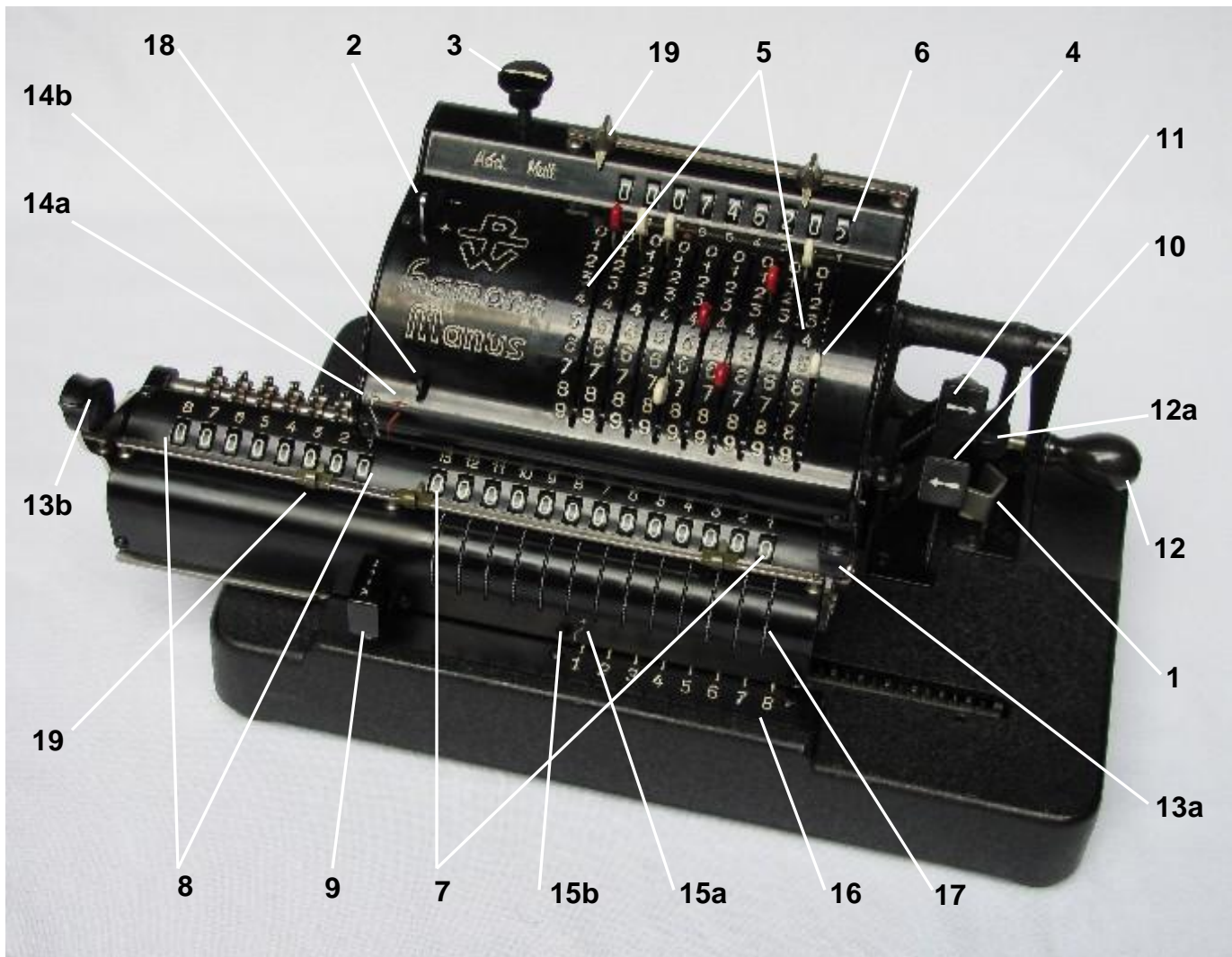## Automatic Division.

Machine set-up.
1. Counter control lever in "-" position.
2. Clearing button 3 in "Mult" position.
3. Carriage release lever 9 in "in" position.

Execution:
4. Using the thumbwheels 17, enter the dividend into the result register 7, starting at the 13. position and with the carriage in the base position.
5. Enter the divisor into the input register 5, beginning to the right of the red dot with the 6. lever.
6. Position the decimal point in the quotient register 8.
7. Move the carriage all the way to the right.
8. Turn crank until the quotient has been calculated.
9. Clear all registers.

See illustration at the end.

The manufacturer and general representatives would be happy to give information about the most effective procedures to solve combined tasks and especially about the usage of the automatic division for addition, subtraction and multiplication.

Explanation of Numbers.

1. Toggle lever for addition and subtraction
2. Counter control lever
3. Clearing button for input register 5
4. Levers for set-up of input register 5
5. Input register
6. Input control register
7. Result register
8. Counter register (quotient register)
9. Carriage release lever (division lock)
10. Key for carriage movement to the left
11. Key for carriage movement to the right
12. Crank

12a. Holder for crank resting position
13a. Clearing lever for result register 7
13b. Clearing lever for counter register 8
14a. Plus arrow
14b. Minus arrow
15a. Plus indicator
15b. Minus indicator
16. Carriage position indicator
17. Thumbwheels for direct setting of numbers in result register 7
18. Release lever for reversing crank
19. Decimal point indicator