

File facit

Facit

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You

who are working with or intending to buy a calculating machine, ought, in your own interest, to glance through the following pages. It will only take a few minutes, but it may result in years of increased satisfaction in your figure work.

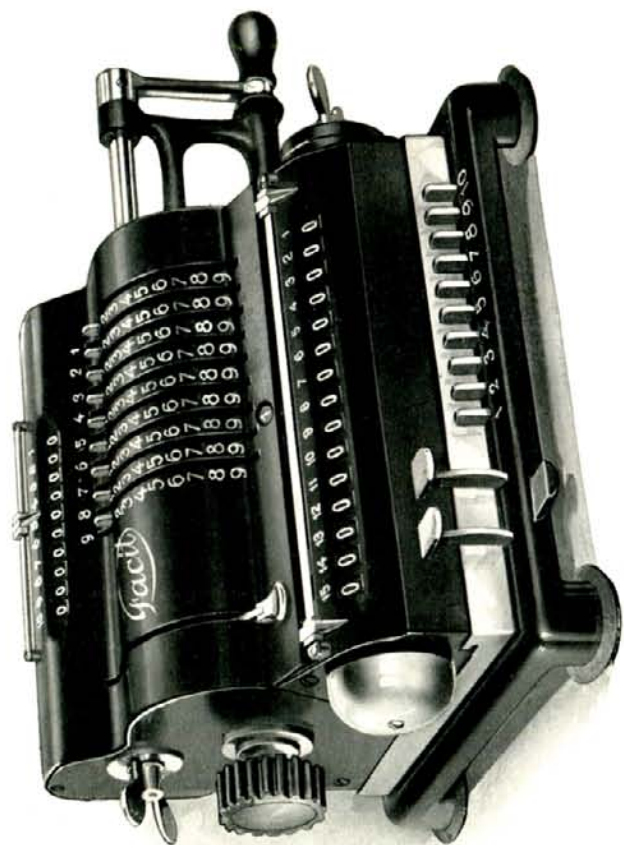
The new Swedish
UNIVERSAL CALCULATING
MACHINE



Manufactured by
AKTIEBOLAGET FACIT
Stockholm
Sweden

Stockholm 1923

Aktiebolaget I. M. Göthes
tryckeri
5156



FACIT capacity 9×10×15

Iron and Steel

solve to-day's problems of calculation

A Short Introduction

but valuable for you

① The FACIT CALCULATOR is an entirely new product, made in a new factory with modern and efficient equipment throughout the plant. This fact has been of the greatest importance in the perfection of the machine itself, since its construction could proceed without regard to previously existing machinery, tools and semi-finished parts, a condition which usually places very serious obstacles in the way of improvements.

② For similar reasons, the experience of the last two decades or more has had an important influence on the design and construction of the FACIT. Whatever this experience has shown to be unessential or superfluous has been eliminated, only what is essential has been retained, and around this nucleus has been built an organic unit — a universal calculating machine embodying easy and convenient manipulation, simple and durable construction, least possible wear and tear, and guaranteeing an infallibly accurate mechanical result.

③ The improvements made from time to time on a machine of this type may be divided into two classes: (1) those necessitated by the demands of customers and their requirements and (2) those which anticipate those requirements and meet a desire only vaguely felt and before it has been clearly expressed.

④ A closer examination of the FACIT will reveal that this calculator not only meets, but in many respects goes beyond, present demands, embodying, as it does, many new and distinct features, as well as other undreamt of advantages.

⑤ These statements apply not only to the external, manipulating organs of the machine, but also to the technical details and to the internal mechanism, which as a rule escapes attention. In the following pages the principal features will be shortly described and elucidated.

⑥ First, however, it should be stated that every detail of the FACIT is the product of the most careful precision work, that the steel and other materials used are of the very best quality obtainable, and that the machine — as regards design, material and manufacture — is a Swedish product.

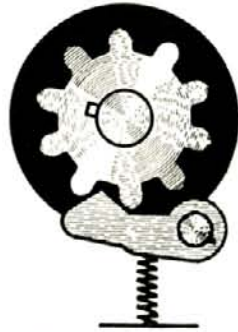
In passing.

FACIT will perform all kinds of calculations involving addition, subtraction, multiplication and division in the shortest time and with a minimum of effort. The following are some examples of what FACIT can do in the hands of an experienced operator:

$927\,333\,187 + 542\,180\,239 + 75\,384 + 6\,278 + 9\,507$	$+ 257\,438 + 95\,574 = 1\,469\,957\,607$	Time 40 sec.
$2\,765\,930 - 2\,748\,693 = 172\,37$		» 10 »
$95\,876 \times 3\,989 = 382\,449\,364$		» 8 »
$43\,513\frac{1}{4} \times 31\,397\frac{1}{2} = 1\,366\,207\,266.875$		» 12 »
$5\,564\,098 : 17\,312 = 321.40123$		» 22 »
Interest on \$46,324.65 for 189 days at $4\frac{1}{2}\%$ per annum = \$1094.42		» 22 »
\$46,324.65 less $1\frac{1}{4}\%$ discount = \$45745.59		» 10 »
$67\frac{1}{2}$ hours at 42 ¢ = \$28.35		» 5 »
76 articles at \$0.96 per dozen = \$6.08		» 4 »
£ 543.9.7 at \$4.8665 = \$2644.84		» 15 »
$\frac{5}{12}$ doz. at \$3.20 pr doz. } $\frac{7}{12}$ » » \$19.00 » » } Total \$102.80.....		» 24 »
$\frac{2}{8}$ » » \$31.90 » » }		
5 gross $7\frac{5}{12}$ doz. at \$113.10 pr gross = \$635.40..		» 12 »
8 doz. cost \$563.40, freight and duty \$23.37. A profit of 25% is to be earned on the purchase price. What should be the selling price of one dozen?		
\$91.68		» 25 »
13 beams 7.20 ft in length } 21 » 5.15 » » } 4 » 3.65 » » } $\frac{4}{8}$ in. = 85.49 cub. ft. » 40 » 12 » 6.35 » » } 19 » 4.85 » » }		
$1.27 \times 0.79 \times 0.61 = 0.612$		» 11 »
$x = 4 \times \sqrt{4.22 - 2.82 \times \frac{0.72}{3}} = 3.0018$		» 35 »

Vis inertiae

Ever since the time when calculating machines of this type were first manufactured, a continuous and uneven struggle has been waged against inertia. The figure dials, once they have been set in motion, have an inherent tendency to rotate too far, and all attempts to design a stop mechanism to remedy this defect have been unsuccessful. True, the stop pawls have undergone changes and improvements, but hitherto increased spring pressure on the stop pawls has been the only remedy.



Oldest type of stop pawl.

This is, however,

A two-edged sword

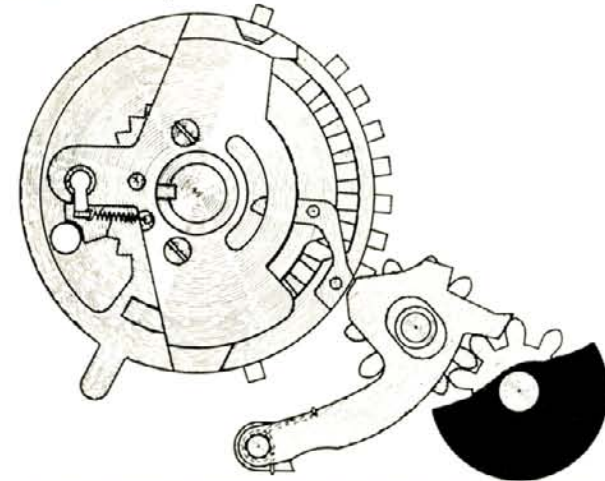
because, according as this spring pressure is increased the machine will work heavier; frictional resistance is increased and naturally also the wear and tear. Thus there have been only two alternatives to choose from: *either* greater reliability combined with increased friction and heavier operation, *or* a lesser degree of reliability combined with lighter operation. In either case friction has been employed as a mechanical function instead of being decreased or eliminated. No absolute safeguard has existed against miscalculations due to the »overthrow» of the dials, an evil which is especially manifest in used and worn machines.



Modern type of stop pawl.

The problem confronting the FACIT

was formulated thus: decrease of spring pressure and of frictional resistance coupled with absolute reliability. But the solution went still further and was in reality, the best result conceivable, or *no spring pressure at all and yet absolute reliability*.



Showing connection between the shoulders on rotor discs and figure dial gears in FACIT.

While other machines are obliged to resort to hard expansion springs in order to secure relative safety, *FACIT affords absolute accuracy without springs*. This result has been achieved by purely mechanical means. The stop pawls have been given an entirely new form and position. In combination with shoulders or projections on the rotor discs they absolutely prevent the »overthrow» of the dials. *Errors on this count are mechanically excluded*. The light spiral springs attached to the stop pawls merely serve to keep the dials in their proper positions.

Another pawl

has also caused a great deal of trouble, namely the transfer carriers, by which the carry-over is transferred from one figure dial to the other from right to left.

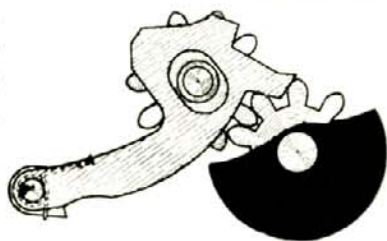


FACIT transfer carrier.

The dilemma has been exactly the same as with the figure dial stop pawls: *either* hard expansion springs, great friction and wear combined with heavy operation, and still only relative safety, *or* light springs and the attendant risk of miscalculation. The latest model of FACIT has attained the right solution: *light springs, light action, small friction, small wear, and yet mechanical guarantee against wrong functioning.*

Wearing qualities.

Reliability—the *conditio sine qua non* in any calculating machine—is in other machines of this type essentially dependent on spring pressure, in other words, on frictional resistance—a fact already demonstrated. This, however, is equivalent to diminished resistance to wear and tear and shorter life, whilst the construction of FACIT has made it possible to reduce friction to a minimum.



FACIT stop pawl.

But lessened friction and wear and tear is synonymous with increased strength and durability, and thus with longer life of the entire mechanism.

A comparison

The easy operation of the FACIT and the smallness of the frictional resistance is convincingly proved by a comparative test with any other machine of similar type and size. If the same number be set up on both machines, it will be found that the difference in respect to ease of operation is extraordinary. As a rule, a number of several digits on the FACIT requires no greater effort on the part of the operator than a single digit on the other machine. Also, in comparison with certain miniature machines on the market, the FACIT is distinguished by its easy and pleasant operation.



Ease of operation even with large numbers.

Concerning miniature or baby machines

To overcome the drawback of the heavy running of the machines in use up to that time, so-called miniature or baby models appeared on the market. These machines, however, have one apparent disadvantage, viz: that the operating parts, especially those most frequently used, or the setting-up levers, are extremely short and difficult to handle because placed at an insufficient distance apart. *The FACIT has succeeded in attaining the objects for which the miniature machines were constructed, chief among which was that of light running, whilst still retaining the convenient, strong and well-dimensioned operating devices of the standard design.* Although, absolutely as well as relatively, the wear and tear on the motive parts of the FACIT is less than in the miniature

machines, the inner mechanism of the FACIT is far stronger and more solid, with larger and more durable wearing surfaces. Owing to its greater weight, the FACIT stands firmly and steadily while in use, even when working with the largest numbers. *Thus the FACIT combines the easy and pleasant operation of the miniature models with the convenient manipulation, durability and wearing qualities of the standard machines.*

Instantaneous clearing devices

On completion of each calculation, all parts which have changed position during the operation must be returned to their original positions in order that the machine may be ready for the next calculation. This is commonly known as clearing. Evidently it is of prime importance that this clearing should take place quickly and reliably and with the least possible exertion on the part of the operator.

The FACIT is provided with instantaneous clearing devices throughout; the return movements are effected by means of the shortest and speediest possible manipulation and, what is more, without any friction in relation to the stop mechanism.

Instantaneous clearing of setting-up levers

If all the setting-up levers are to be returned simultaneously to their zero positions, the clearing lever on left side of machine is used. The clearing is effected smoothly and pleasantly and with a convenient grip. This is a considerable improvement on devices hitherto in use, where the clearing was done by jerks and under heavy resistance.



Clearing lever.

Instantaneous clearing of product register

The new design of the FACIT stop pawls made it possible to construct a clearing device of the utmost simplicity for the product register — another advantage. *By a half-turn forward of the wing nut, the clearing is accomplished*

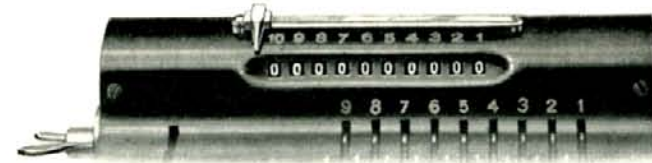


Half-turn clearing of product register.

quickly, accurately and without friction, i. e., with disengaged stop pawls. No return movement of the wing nut is necessary, thus eliminating the faults and inconveniences of that particular type. Another advantage is that, owing to the manner in which the constant half-turn clearing device has been constructed, it does not appreciably lengthen the carriage.

Instantaneous clearing of quotient register

is effected in exactly the same manner as the product register, by a half-turn of the wing nut *with disengaged stop pawls and without any return movement.*



Half-turn clearing of quotient register.

The quotient register of the FACIT is located on the top of the machine, in good focus. This arrangement permits of a shorter carriage, as well as increased capacity of both the quotient and product register.

The setting-up levers

are the parts of the machine most frequently used. Hence it is very desirable that they should be as easily grasped as possible. Probably everyone who has used similar machines has had unpleasant experience with these setting-up levers. If they are too short and difficult to grasp,



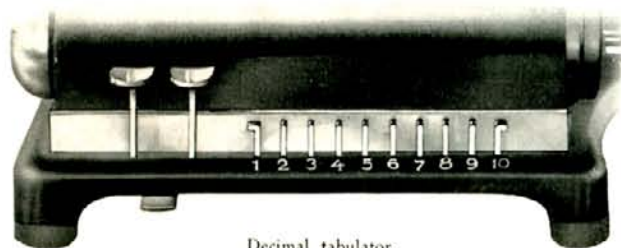
Lengthened setting-up levers.

they will, especially when in constant use, prove a source of irritation to the operator. The special construction of the FACIT has made it possible to lengthen somewhat the setting-up levers. *They are easy to grasp and move without rasping the fingers on the covering plate.*

Inside the machine the setting-up levers are continued by the rotor discs, which regulate the sliding teeth. The rotor discs of the FACIT are of a new design provided with light bearings and an exceedingly effective locking device.

Decimal tabulator

FACIT is the first and only calculating machine of its type in which the decimal tabulator principle has been applied



Decimal tabulator.

for moving the carriage. If you wish to move the carriage only one step, you need only press down one of the keys at the left. If it is necessary to move the carriage several steps to a certain position, use the knob on the left side of the machine, at the same time pressing down the decimal key for the position desired. The 1st and 10th decimal keys are used when the carriage is to be moved to its extreme end positions, or when returning to the original position. *By means of these new arrangements, the FACIT carriage is moved swiftly, accurately and with exceedingly great ease.*

Automatic safety devices

A calculating machine would not be considered complete if it did not prevent miscalculations due to involuntary mistakes in handling. Also, it is a great desideratum that it should prevent, or still better, preclude such damage as might lessen its usefulness and reliability. *FACIT has been equipped with complete automatic and reciprocally acting safety devices.*



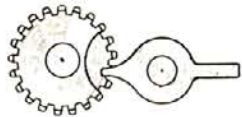
Reciprocal locking of operating organs.

Locking of the setting-up levers

operates as soon as the turning of the crank begins, and *continues until the handle is again returned to its neutral position.* Other machines either completely lack this locking device, or else it does not function at the time the crank is near or passing this neutral position, which is the most critical point where a miscalculation may result from the involuntary shifting of the position of the setting-up levers.

The return catch

Another safety device is provided in the return catch, which automatically prevents the crank from being reversed when the crank movement has proceeded so far as to endanger or cause a miscalculation. This mechanism is directly connected with the gear of the crank shaft. *It is distinguished by its simple and reliable construction and noiseless operation.*



Return catch.

The bell

If, in very large calculations, the capacity of the machine should be exceeded, this is announced by the machine itself by means of an automatic signal bell. This bell also functions if, in subtraction, a larger number should be deducted from a smaller one; also if, in division, the divisor should be deducted too many times from the dividend. *In all these cases the machine itself will warn against mistakes of this nature, which might otherwise figure in the answer.*



Signal bell.

In conclusion

Automatic locking occurs also in the following cases:
As long as the crank is not in its neutral position, the wing nuts, carriage and setting-up levers are locked.
If the wing nuts are not in their correct slanting positions, neither the crank nor the carriage can be moved.

Conversely, should the carriage not be placed in its correct position, a corresponding locking of the crank and wing nuts occurs.

Capacity

The FACIT has 9 setting-up levers, 10 dials in the quotient register and 15 in the product register. Thus, the ordinary model of the FACIT has a considerably larger capacity than is usually provided, whilst the size and weight of the machine have been suitably reduced.

The leading principle

in the construction of the FACIT has been to produce a calculating machine which should combine:

*short, easy and convenient manipulation,
a minimum of wear and friction,
best materials obtainable,
strength and durability,
reliability founded on mechanical features.*