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**The mechanical calculating machines based on patents
by
Gian Piero Barozzi and Giancarlo Horeschi**



Part 1

ROMANONI and REMINGTON RAND

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ROMANONI and REMINGTON RAND

English translation by Yuki Barozzi

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Rechnerlexikon

Die große Enzyklopädie des mechanischen Rechnens

For other mechanical computing machines based on patents by
Gian Piero Barozzi and Giancarlo Horeschi

please refer to *Rechnerlexikon*:

Citizen - Ricoh

Cover:

Romanoni Model *Wunder*,

S/N 001.612

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1. Introduction:

Towards the end of the 1950s, Gian Piero Barozzi (b. Dec. 1937) and Giancarlo Horeschi (b. Feb. 1938) started a joint, successful professional career in the development and production of mechanical calculators.

Their hometown was Crema, in the province of Cremona in northern Italy. After a first start as designers in a local company, they worked together from 1961 for the Italian Remington Rand division in Naples, Italy, a sister company of the Sperry Rand Corporation in New York.

Both were two highly qualified developers and by joining professionally they complemented each other perfectly, especially in the fields of design and production technology.

Their close collaboration lasted until 1984 and their success is documented by approximately seventy patents, in which both are named as inventors. Most patent applications were filed by their employers but Barozzi and Horeschi are referred to as the sole inventors in almost all these patents. This means they played a role of primary importance in the development of several calculating machines, most of which had a large diffusion throughout the world.

This first article describes the working activity of Gian Piero Barozzi and Giancarlo Horeschi in Italy at the Romanoni company and Remington Rand. Two other articles that describe their activity in Japan for Ricoh and Citizen will follow.

The authors' purpose is to describe the mechanical engineering applied to calculating machines as well as the activities of their inventors. The sources of information are based upon the inventors' personal memories completed with documents like patents, promotional material and photographs.

Gian Piero Barozzi provided plenty of information in chronological order and old photos and drawings of their works. Photos of the *Wunder* Machine were delivered by Jörg Thien, Innsbruck.

We are especially grateful to both.

Andrea Celli and Peter Haertel

2. The beginnings at Everest factory in Crema:

In 1953, Gian Piero Barozzi became an employee of Serio S.p.A., the manufacturer of Everest office machines, based in Crema, his hometown. Here he was given a comprehensive insight

into the technology and production of mechanical calculating machines and had the idea of building an innovative machine. One year later, in 1954, Horeschi was hired by the same company working first on the assembly of typewriters and then on the assembly of adding machines.

Barozzi and Horeschi were schoolmates and both were full of ambitious plans. Together they started their own private project aimed to design an accounting machine.

A few months later, the team was joined by their workmate Ferdinando Bertolotti (b. April 1938) who was working in the assembly typewriters department.

Shortly afterwards, the three friends realized that without enough experience and financial resources the accomplishment of such a complex machine was much more difficult than they had expected. Therefore, they came back to original idea of designing an adding machine with better features than the one Everest was producing. They started to work on this project, and they designed, experimented, and built a first prototype of the machine in Barozzi's flat.

They presented the functioning prototype to the Everest headquarters in Milan, as agreed with the CEO, who showed enthusiastic interest. However, the director of the research and development department in Crema factory, where Barozzi was currently working, could not accept this autonomous initiative and soon the basis for a trusting cooperation was lost. On March 3, 1957, the three friends decided to left the company.

3. Giuseppe Romanoni–Macchine per ufficio, Pavia:

The company was founded in 1945 by Carlo Raguzzi with business partners Luigi Raguzzi and Giuseppe Romanoni. The core business was the production of sewing machines. They also tried to produce drills and office machines¹.

In 1957, Giuseppe Romanoni was the business owner when the company decided to develop and produce a balancing machine.

From today's perspective it was a great risk, because the company was competing with the overpowering Italian Olivetti Group, and other Italian competitors, including – just a few kilometers from Pavia – the Everest plant in Crema.

3.1 Design of Romanoni Adding machine:

1 Information by Pavia Trade Association and Gian Piero Barozzi

Since the beginning of March 1957² Gian Piero Barozzi, Ferdinando Bertolotti and Giancarlo Horeschi worked in the design department of

Giuseppe Romanoni–Macchine per ufficio, in Pavia.

Their task was to engineer the production of the adding machine. The company target was to exhibit the machine at the upcoming Milan fair in April. That was a big challenge. They worked daily 16 hours each covering 24 hours on three shifts. To achieve the goal, they relied on components of the prototype they had built in Crema during their Everest period and entrusted other companies to produce parts.

A prototype of the machine was presented on April 25, 1957, – the last day of the Milan fair – under the name *Wunder* (Fig. 1), at the stand of a friend's company.

Fig. 1:

Advertising 1957
for the new
Wunder
Adding machine
without
total key.

(Image of the
prototype)



The first technical details were published in a brochure:

- Calculating capacity 8 x 9 or 10 x 11
- Light hand lever operation
- Direct subtraction (balance function)
- Automatic line spacing
- Patented TOTAL function
- Width of the paper roll: 68 mm
- Automatic changeover and easy exchange of the ribbon

2 Information by Gian Piero Barozzi / March 2017

- Ribbon width 11 mm
- Metal casing
- Dimensions (L x W x H): 300 x 210 x 145 mm
- Weight: about 7 kg.

The last page of the small brochure shows a common logo of the machine builders:
Romanoni, Barozzi, Bertolotti, Horeschi



After the Milan fair, they started organizing for series production. The new machine concept was promising and on June 3, 1958, Giuseppe Romanoni filed a patent under IT613812 (Fig. 2) for "*Improvement of the operation of the hand adding machines when querying the total*"³, in which the grand total is automatically generated with a lever pull without previous input⁴.

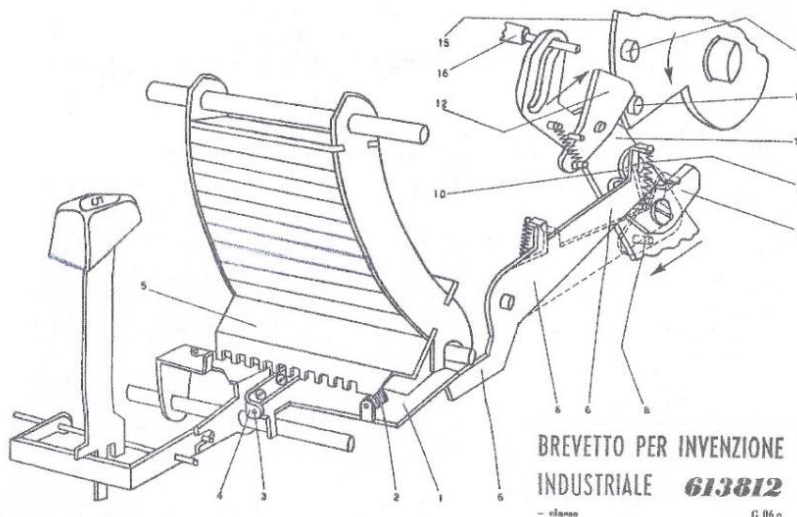


Fig. 2:

Drawing for the application of the industrial patents IT613812 of 1958.

In the original text of the patent application IT613812 of June 3, 1958, the designers Barozzi, Bertolotti and Horeschi are named as inventors. After a consultation of the Patent Office on January 29, 1959, the decision to delete the names of all three inventors in the patent was issued on October 22, 1959.⁵ A possible explanation for this may be that they had not yet achieved their legal capacity of business at the time of

3 Original Italian title: "*Perfezionamento alle macchine addizionatrici a mano, per eliminare una manovra dell'operatore all'atto di richiedere il totale*".

4 TOTAL-function without function key was available also on the hand driven adding machine Everest *Addenda*. However, *Addenda* required an additional lever pull.

5 Files of the Italian Patent Office, conserved at the Central State Archives (Rome)

registration under the Italian law of that time for reasons of age⁶.

They had similar problems with their contracts for patent remuneration. Legally, they were not allowed to sign documents. Their parents could sign contracts in their place only after a request at a guardianship court⁷.

On July 1, 1960, Gian Piero Barozzi became the head of the manufacturing and toolmaking departments.

3.2 Details of the serial version:

The appealing two-tone casing of the series machine (Fig. 3) was built according to the designs of the architect Aldo Corbella from Pavia. The mechanics are plain and run smoothly and quietly.

Fig. 3:

Adding machine
Wunder,
 S/N 001.612,
 with reduced
 function keys,
 calculating capacity
 10 x 11

Collection
 Peter Haertel,
 DE-Lilienthal



Registration of serial numbers started at 1000.

Known Serial Nos.:

| Model: | Serial nr.: | Collection: |
|------------------------------|--------------------|--------------------|
| <i>Special Model TE 1000</i> | 001.212 | DE-Peter Haertel |
| <i>Wunder</i> | 001.612 | DE-Peter Haertel |
| <i>Wunder</i> | 001.679 | IT-Wolfgang Irlner |
| <i>Wunder</i> | 002.013 | IT-Andrea Celli |

⁶ Until 1975, for the Italian Civil Code a person under 21 was a minor. Nowadays the age of majority is 18. A minor is considered unable to evaluate risks and benefits and is not allowed to sign a contract.

⁷ Correspondence of Severino Barozzi (Gian Piero Barozzi's father) with the Guardianship Judge of the City of Crema of 29.10.1958, 30.10.1958 and 08.11.1958.

User-relevant facilities:

- Two operations machine: addition and subtraction,
- Calculating capacity 10 x 11,
- Data balance: a negative result is shown as an absolute number with a minus sign,
- Ten-key keyboard,
- Input indicator,
- Repetition function: (X taste),
- Function keyboard without total key (TOTAL),
- Clearing devices:
 - The red key "C", activated through a slide, erases the last input and resets the "X" key if depressed.
 - The reset of the depressed "X" key is also achieved by pressing the black key on the right.
- Machine drive with manual pull lever, the angular movement of which is transmitted to the oscillating main shaft of the computing mechanism by means of a connecting rod.
- 11 mm one color print black ribbon, spools with locking tabs, mounting hole for 5 mm bearing pins.

Fig. 4:
Romanoni
Model *Wunder*,
S/N 001.612,
without
casing.



Design details:

- Construction of the machine chassis by two highly precise side panels⁸, which are connected by fixed round steel shafts - where also the pin carriage is guided - and four rectangular steel profiles with angled ends (Fig. 5).

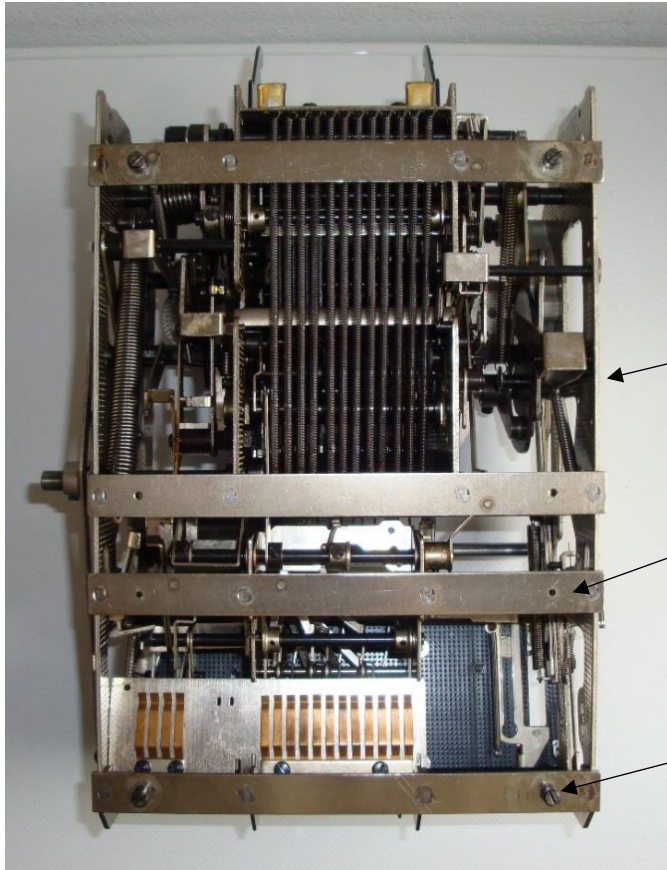


Fig. 5:

Bottom view,
casing
removed.

Left side panel

rectangular
steel profiles

bolts for fixing the
mechanics in the rubber
elements

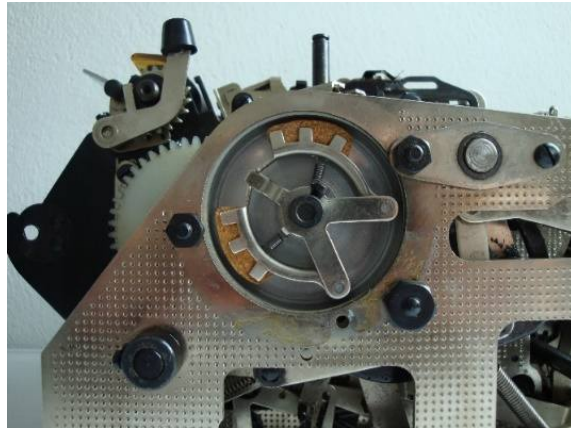
- The machine is supported by four rubber elements fixed on the lower casing.
- Printing unit and arithmetic unit together form a separate assembly unit. This is located between two smaller inner panels and screwed to the outer panels via hexagonal columns.
- The pin carriage has an arcuate side contour and is vertical.
- The casing consists of the upper plastic part⁹ with removable cover for ribbon changing and a lower flat steel base.
- Removal of the upper part casing by unlocking internal brackets, which are attached to the steel base.
- Printing mechanism with type bars

⁸ Manufactured by means of punch press

⁹ Material ABS (Acrylonitrile-Butadiene-Styrene)

- Machine dimensions:
Width: 22 cm; with hand pull lever 26.5 cm
Depth: 31.5 cm (without paper roll)
Height: 16 cm
- Machine weight: 6.09 kg (without paper roll)
- Mechanism with centrifugal brake, which is driven by the main shaft via toothed wheels (Fig. 6).

Fig. 6:
Centrifugal brake for
controlling the
mechanics,
protective cover
removed.



The ribbon width and coil indicate that this machine was not intended only for the European market. Otherwise, well-suited ribbon and coil formats according to DIN standards would have been provided. This would have been possible without an extensive modification of the mechanics. However, an 11 mm band of the group 44 with the coil D 37/5 was used¹⁰.

3.3 Sales and service:

In Italy and neighboring countries and in the U.S.A. the sales and after-sales service were carried out by regional wholesalers or office machine dealers.



Fig. 7: ROMANONI - FABBRICA ITALIANA MACCHINE PER UFFICIO,
PAVIA ITALY
advertisement for a new machine concept.

¹⁰ Pelikan AG, Hanover, Catalog 1967

The Romanoni advertising focused on the new, simplified operating concept with reduced keyboard (Fig. 7). An identical machine was produced for the German TransEuropa GmbH in Hanover and named TE 1000 (Fig. 8, 9).



Fig. 8:

Model TE 1000,
SN 001.212

Collection
Peter Haertel,
DE - Lilienthal

HAND-SALDIERMASCHINE
mit Kontrollstreifen

TE 1000

- 10 Stellen im Einstellwerk
- 11 Stellen im Resultatwerk
- unter Null rechnend
- mit direktem Summenzug
- sichere Funktionstasten mit Einzellöschung
- Gesamtlöschung für Zählwerk und Funktionstasten
- unzerbrechliches Kunststoffgehäuse

Der vorzügliche Helfer im Büro

Die **TE 1000** nach dem international genannten 10-tastensystem gebaut, bringt alle Vorzüge mit, die von einer einfach und leicht zu bedienenden Additionsmaschine verlangt werden. Mit nur 4 übersichtlich angeordneten Funktionstasten können fast alle vorkommenden Rechenarten bewältigt werden. Saubere und gut lesbare Zahlen erleichtern die Kontrolle. Handlichkeit und spielend leichte Bedienung lassen die Maschine zu einem unentbehrlichen Helfer in allen Betrieben werden.

TransEuropa G-M-B-H-HANNOVER
POSTFACH - RUF 15868

Fig. 9:
Advert in BZB
(Burghagens Zeitschrift
für Bürobedarf), 1960

TransEuropa offered the machine in the Federal Republic of Germany for DM 438,- (excluding VAT) (Fig. 10).

| Fabrikat: | TE | |
|-------------|---|-------|
| Hersteller: | Officine Romanoni, Pavia/Italien | |
| Importeur: | Transeuropa Büromaschinen-Vertrieb GmbH, Hannover 1, Postfach, Telefon 1 58 68 | |
| Modell | Kurzbeschreibung | DM |
| TE 1000 | Zweispiezmaschine, Streifendruck, Zehnertastatur, Resultatwerk, Handantrieb, Kap. 10/11stellig, mit direkter Subtraktion, unter Null rechnend, mit direktem Summenzug, Einzel- und Gesamtlöschung für alle Funktionen | 438.— |
| 574 | | |

Fig. 10: *TransEuropa's* advertising in the *Büromaschinen-Lexikon*, 1961/62, p. 574, Göller-Verlag, Baden-Baden.

For comparison, the sales prices of Italian hand-driven machines with computing capacity 10/11, which were offered at the same time were:

- EVEREST Plurima : DM 478,-
- OLIVETTI Prima 20: DM 448,-(prices excl. VAT)

After the production had started, Giancarlo Horeschi visited Hanover (Federal Republic of Germany) for a few weeks and trained maintenance workers of the German reseller.

In 1960 it became known that Giuseppe Romanoni would sell his company including patent rights. To achieve the transfer of the patent rights, Barozzi and Horeschi received a fair compensation. Ferdinando Bertolotti, who had to leave the company earlier because of his call up for the army, received a similar compensation after his return.

3.4 Company takeover by Remington Rand Italia S. p. A.

In 1961, the Italian Remington Rand Division in Naples took over the Romanoni Company including production facilities and patents¹¹. Naples became the new headquarter for all employees who had been transferred over from the Development and Production departments.

4. Remington Rand Division in Naples:

In 1954, Remington Rand inaugurated a new factory in Naples producing appliances and office-machines. The director, Enrico Battisti, and most of the managers came from the Remington-Rand division of Argentina. This establishes a link between the two divisions, link that could be considered relevant in the following.

4.1 Redesign of the Romanoni machine:

With the take-over of the Romanoni company in 1961, Barozzi and Horeschi became Remington employees with temporary employment. The company target was the further development of the Romanoni adding machine and they were asked to improve the machine with mainly the following features:

- Electric drive
- Two-color ribbon
- Multiple zero buttons.

According to Italian law, if the improvements were achieved, both Barozzi and Horeschi should get an extra bonus of 770,000 lira as a flat rate.

¹¹ The Romanoni patent IT 613812 of 1958 was overwritten on September 14, 1961, by the Remington Rand Division Italia. The current patent fees were paid until 1966.

At the end of the temporary employment, they were offered a permanent employment¹².

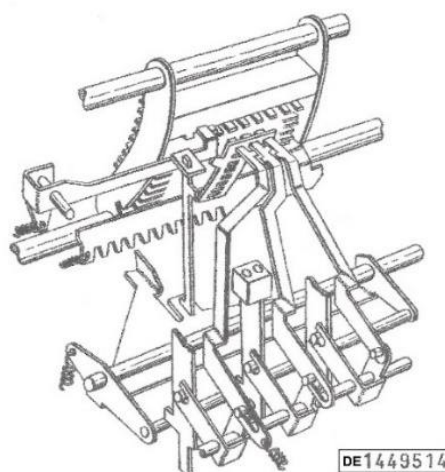
As a result of this development work, in the years 1962 and 1963 Remington Rand filed several patent applications, in which Barozzi and Horeschi were named as joint inventors and Sperry Rand Corporation as the owner.

A selection of patents:

| Patent No. | Registration | Title |
|------------------|--------------------------|--|
| <u>CH403354</u> | 19.06.1962 ¹³ | Mechanismus zum selektiven Einführen einzelner Ziffern oder einer Mehrzahl der gleichen Ziffern in ein Rechenmaschinenregister. |
| <u>FR1358903</u> | 10.06.1963 | Mécanisme pour introduire sélectivement des chiffres uniques ou bien plusieurs fois les mêmes chiffres dans un registre d'une machine à calculer |
| <u>US3155315</u> | 13.06.1963 | Mechanism to selectively insert single digits or a plurality of the same digits into a calculator register. |
| <u>DE1449514</u> | 18.06.1963 | Mechanismus zum selektiven Einführen einzelner Zahlen oder einer Mehrzahl der gleichen Zahlen in ein Rechenmaschinenregister. |
| <u>IT698368</u> | 19.06.1963 | Meccanismo per la introduzione selettiva di singoli numeri o di una pluralità di numeri uguali in un registro di calcolatrice |
| <u>DK107713</u> | 19.06.1963 | Mekanisme til valgfri indstilling af enkeltcifre eller et antal cifre i en regnemaskines register. |

All patents deal exclusively with the technique of data input on mechanical calculating machines (Fig. 11).

Fig. 11:
Mechanism for input
of the values 1 to 9
and
0, 00 and 000¹⁴ in the
pin carriage
(input memory)
of an adding machine.



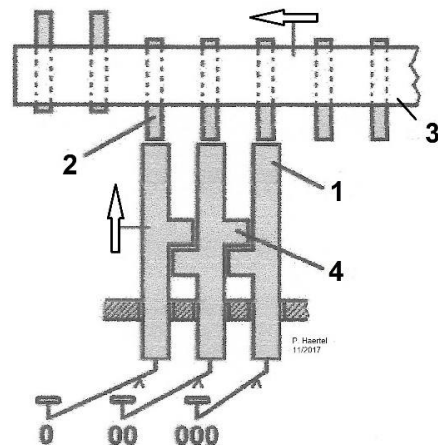
¹² Remington Rand Italia S. p .A. Milano, DIREZIONE GENERALE / Ufficio Personale, Letter 06/01/1961 to Gian Piero Barozzi, Naples.

¹³ First registration from the European Sperry Rand branch in Lausanne (CH); it sets the temporal priorities for the property rights subsequently registered under the same title (with the exception of the USA and Canada).

Major features are the three setting levers (1) for the pins (2) of the pin carriage (3). Four side cams (4) are arranged so that only one pin (2) is set when the left zero key (0) is pressed. When the middle key (00) is pressed, the setting lever of the left key (0) is also in function. Pressing the right key, (000) the setting levers of the three keys (0, 00, 000) are in function (Fig. 12).

Fig. 12:

Setting levers with overlapping cams for the number keys 0, 00 and 000 (Scheme)



4.1.1: Renaming in Remington 74:

After the takeover in 1961, the Romanoni adding machine *Wunder* continued to be produced with the same technology and marketed as *Remington 74* (Fig. 13).



Fig. 13:

Model Remington 74 in the 1961 version.

Only the labeling of the casing was changed. As a result, it is possible to find the machine with different color variants (Fig. 14).

14 The Remington models 74 and 77, derived from the Romanoni machine *Wunder*, were sold with multiple zero keys. The installation position corresponds to DIN 9753 norms for ten-key keyboards.



Fig. 14:
Examples of color variants
of the
Remington 74
casing

The first improvement in machine performance was the addition of a two-color ribbon in 1962¹⁵. The introduction of the three zero keys followed shortly after. (Fig. 15).



Fig. 15:
Model
Remington 74,
version with
three zero buttons

Collection
Andrea Celli,
IT-Rome

The development of an electric drive had also been completed (Fig. 16). The question whether this machine went into series production or not remains unanswered.



Fig. 16:
Prototype of an
electrically driven
adding machine

15 Cf. Göller-Verlag: *Büromaschinen-Lexikon*, 6th Issue 1962/63, Baden-Baden 1962, p. 243.

In the years 1962 and 1963 in the Federal Republic of Germany the price of *Remington 74* was DM 395,- (without VAT)¹⁶.

Product advertising focused on having simplified operation of the machine by removing the total key (Fig. 17).

TOTALE

L'abbiamo eliminato

Ma il totale, allora, come si ottiene? Con un *solo* colpo di manovella. La nuova addizionatrice scrivente REMINGTON 74 non ha bisogno di un tasto di comando per dare il totale.

Abbiamo anche abbreviato la corsa della manovella e quella dei tasti, il che fa risparmiare altro tempo. Il tasto del totale non è però la sola cosa che abbiamo eliminato. L'altra è il rumore, che è ridotto al minimo grazie alla accuratezza con cui la macchina è costruita e montata.

La REMINGTON 74 è più pesante delle altre addizionatrici, e così non si sposta sul tavolo mentre viene adoperata. Tuttavia, con i suoi 6 chili di peso, rimane un'agevole macchina portatile.

Addiziona, sottrae, moltiplica, calcola il saldo negativo, dà il totale parziale e quello generale; ha la capacità di 10 cifre per l'impostazione e di 11 cifre per il totale; disinserisce automaticamente i tasti di comando.

Remington Rand Italia
304

FILIALI E AGENZIE OVUNQUE

Fig. 17:
Advertising *Remington 74*

Further sales arguments were the quiet working noise; the machine weight over 6 kg was also highlighted as a special advantage because the heavy weight

"[...] prevents the moving of the machine on the desk when the hand lever is pulled continuously".

4.1.2 Redesign of *Remington 74* and renaming in *Remington 77* (Fig. 18):

The specialist magazine "*Ufficio Moderno*" wrote that

"La nuova addizionatrice scrivente *Remington 77*"
- The new printing adding machine *Remington 77* -

was presented at the Milan fair in April 1965. The new model 77 differed from the previous model 74 by two zero keys and a new outer casing shape.

Also, for this model 77, it is not proven that an electric drive was ever manufactured.

¹⁶ Distributed by Remington Rand GmbH, Frankfurt am Main



Fig. 18:

Remington 77
with two zero buttons
and new outer casing,

Collection Andrea
Celli,
IT-Rome

In 1967, the regular US sales price of this machine was \$ 115.00 (Fig. 19). This was clearly above the sales price of other inexpensive Remington adding machines.

Fig. 19:

US advertising 1967
for *Remington 77*
in the daily paper
The Herald Bulletin:

Special offer,
Office Machines Dealer
Baskerville
in Anderson, Indiana

In the Federal Republic of Germany the selling price in 1967 was DM 325,-¹⁷. In the years 1968/1969 it was reduced to DM 314,-. The sales came to a stop in the late 1969s. Electronic calculators were significantly increasing their market shares and hand-driven mechanical calculators were difficult to sell.

4.2: Sales by Torpedo Office Machines GmbH:

The model *Remington 77* was marketed in 1967 with the same technical design by Torpedo Werke GmbH in Frankfurt am Main (Fig. 20); the sales name was *Torpedo 77*.

Fig. 20:
Model
Torpedo 77
of 1967

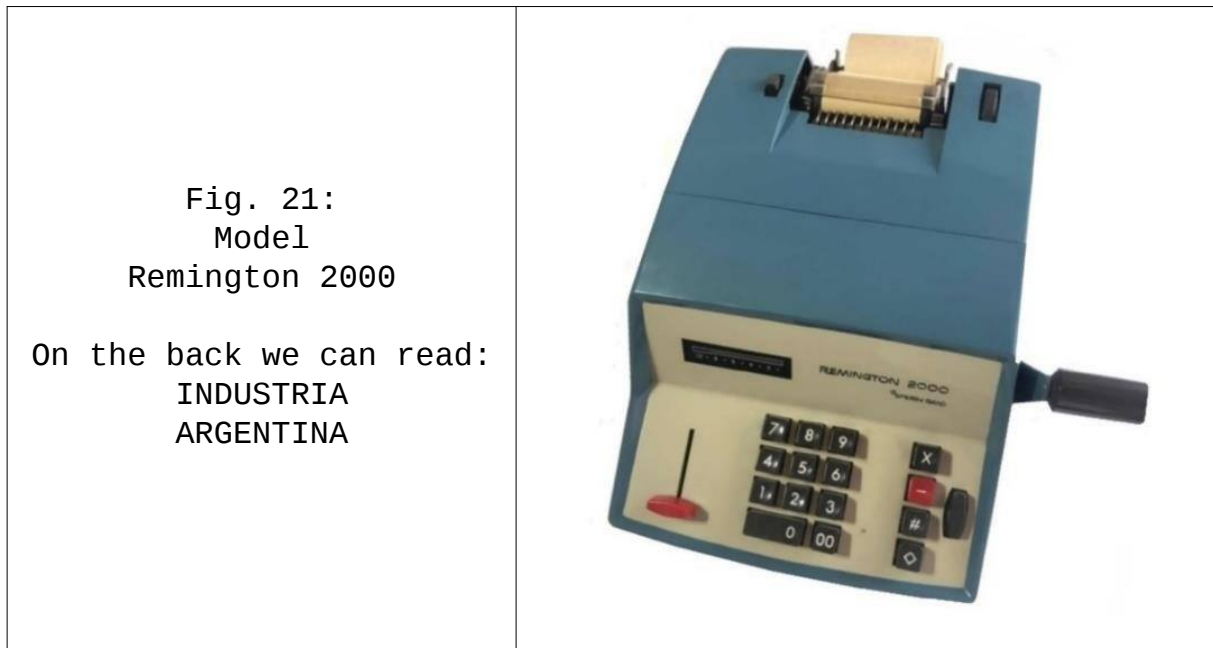


In 1967 and 1968 Remington and Torpedo published joint advertisements. The machine price of both companies was DM 325,-. The machine sales of Remington and Torpedo were discontinued at the same time.

4.3: Remington 2000 made in Argentina:

For the South American market an identical machine was made in Argentina by the Sperry Rand Corp. (Fig.21). Only the color of the casing and the model name were changed. The afore-mentioned personal relationship between the Italian and Argentine branches of the company could have influenced the decision to start this production. Today you may easily buy online a used Remington 2000. This availability on the market could indicate a larger diffusion of the machine.

17 Cf. Göller-Verlag: *Büromaschinen-Lexikon*, 11th Issue 1967/68, Baden-Baden 1967, p. 316; prices without VAT.



4.4 Analysis of Remington Rand Corp. marketing strategy

The marketing of the model Remington 77 started in 1965. At this time, low-price machines had been offered for years. At Remington, there were no attempts to promote the sales figures of the revised Romanoni calculator specifically on the US market. This would have required price reductions, because the hand-driven machine was significantly more expensive than model *Remington 8* with electric drive.

The electric drive developed by Barozzi and Horeschi in 1961/62 was also not used in the USA and Europe. There was obviously no further need for low-cost machines with electric drive.

The slogan:

„The world`s first electric portable adding machine at such a low price“

had been promoting the Remington model 8 since 1962 at a price of \$ 79.50 (Fig. 22). For US standards this price was very low and could hardly be undercut.

In one of the first machine presentations it was said:

*[...]. The machine, that weighs 4 kg, is said to have 544 moving parts, less than a conventional adding machine with 1200 parts. [...]*¹⁸.

18 *Der Büromaschinenmechaniker, Zeitschrift für Büromaschinen-Technik, -Reparatur und -Wartung; 45th Issue, Volume 4, Hamburg Dec. 1962, Page 256*



Fig. 22:
Remington
advertising in 1962:
Model 8,
calculating capacity
8 x 9,
selling price \$ 79.50.

In the Federal Republic of Germany this machine was sold by Torpedo since 1963. The model name was *Torpedo 8*, selling price DM 345,-¹⁹. In 1964 the price lowered to DM 325,-. Price comparison: In 1963 the Olympia model 1182-050 with the same calculating capacity and electric drive cost DM 665,-.

The next model *Remington 9* (Fig. 23) was also a low-price model. This printing adding machine with electrical drive and calculating capacity 8 x 9 was built according to US Patents of the Clary Corporation and the Addmaster Corporation²⁰. In the Federal Republic of Germany the selling price of this machine was DM 366,-²¹. Price comparison: In 1962 Odhner model E9-S with the same calculating capacity and electric drive cost DM 612,-.

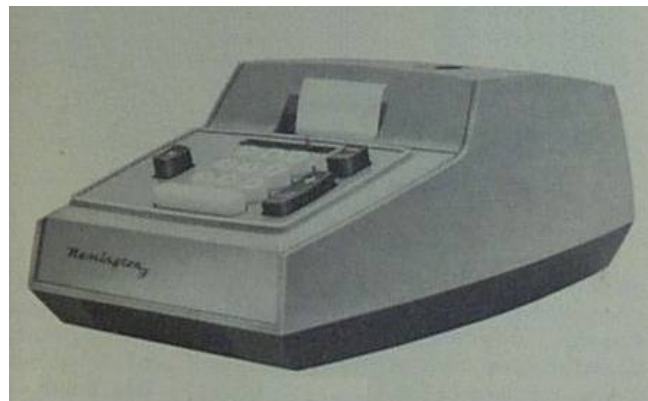


Fig. 23:
Remington Model 9
of 1969,
calculating capacity
8 x 9.

¹⁹ Cf.: Göller-Verlag: *Büromaschinen-Lexikon*, 7th Issue 1963/64, Baden-Baden 1963, p. 298; price without VAT.

²⁰ Cf. 1) US Patents Nos. 3094278 and 3095143, both filed on September 25, 1961.

2) Möller, H.: "The use of plastics in a newly developed adding machine" in: *Der Büromaschinenmechaniker, Zeitschrift für Büromaschinen-Technik, -Reparatur und -Wartung*; 115th Issue, Volume 10, Hamburg May 1968, p. 87

²¹ From 1964, this machine manufactured in the US was sold also by the Torpedo Büromaschinen Werken GmbH as Model 9 for the same price of DM 445,- (VAT excluded); Göller-Verlag: *Büromaschinen-Lexikon*, 13th Issue 1969/70, Baden-Baden 1969, p. 425

5. Later years in the lives of Barozzi and Horeschi:

The redesign of the Romanoni machine, taken over by the Remington Rand Division in Naples, was completed in 1962. At the same time Barozzi and Horeschi ended their employment contracts with the company.

The 1962-1964 period witnessed them working in Crema on two projects for the Indian businessman Dr Homi Rustam de Vitre. They developed on his behalf:

- A motor-driven two-species balancing machine, of which two prototypes were built.
- Further development of this machine to a three-species machine with shortened multiplication,²² of which a prototype was built.

For this purpose, the necessary drawings for individual parts and assemblies were made. The architect Aldo Corbella in Pavia designed the machine casing and supplied several drawings.

De Vitre applied for a patent for both developments and sold them to Ricoh Company Ltd. in Tokyo. Barozzi and Horeschi went to Japan to set up and monitor production. Here they worked at Ricoh²³ from August 1964 to October 1965.

One month later they are hired by the Citizen Business Machines Inc, where they will work until 1977.²⁴

Their developments were successfully sold worldwide by Ricoh and Citizen in various machine variants.

When the production of the mechanical calculating machines came to an end, they worked from 1978 to 1984 in the typewriter development. In the years 1979-81, almost all patents were registered by Xelavis S.A. with headquarters in Panama City and Lugano as well as by Tokyo Juki Industrial Co., Ltd.

In 1984, after two decades abroad, both returned to their home country in Italy. They were now forty-six years old.

Giancarlo Horeschi became CEO for Juki-Union Special Ltd. Industrial Co.

²² Basis for US Patent 3369744 filed July 1, 1965 by Ricoh Company Ltd., patented Feb. 20, 1968.

²³ See *Rechnerlexikon: „The computing machines based on patents Gian Piero Barozzi and Giancarlo Horeschi, Part 2 - Ricoh“*.

²⁴ See *Rechnerlexikon: „The computing machines based on patents Gian Piero Barozzi and Giancarlo Horeschi, Part 3 - Citizen“*.

Gian Piero Barozzi became owner and president of the Italian AISA S.p.A. in Ticengo (Cremona), now GSKET s.r.l., a globally operating developer and manufacturer of production plants and equipment. He is named as the inventor in about twenty AISA and GSKET patents. Last patent was registered in 2019.

6. Sources of images:

| Images: | Sources |
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