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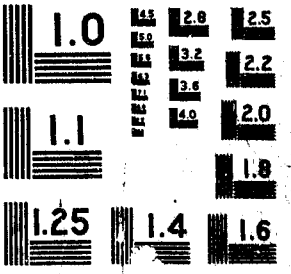
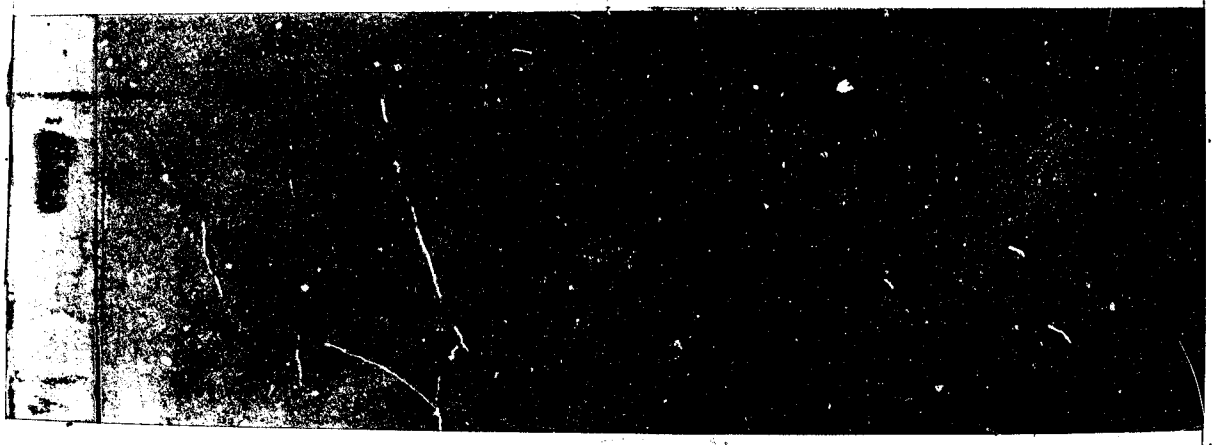


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963



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AMENDED

COMMONWEALTH OF AUSTRALIA

The Patents Act 190 3-1950

APPLICATION FOR A PATENT FOR AN INVENTION COMMUNICATED FROM ABROAD.

I, FREDERICK BERNHARD RICE, of Club Chambers, 96 Phillip Street, Sydney, in the State of New South Wales, Commonwealth of Australia, Patent Attorney, hereby apply that a Patent may be granted to me for an invention entitled:

"MULTIPLE CALCULATING MACHINE"

And I declare that CURT HERZSTARK of Nendeln in the Principality of Liechtenstein, Engineer, and EMIL ECKSTEIN of Feldkirch, Austria, Engineer, are the actual inventors thereof and that the said invention has been communicated to me by CONTINA BUREAUX UND RECHENMASCHINENFABRIK AKTIEN-GESELLSCHAFT of Vaduz in the Principality of Liechtenstein, Manufacturers, the Assignees of the actual inventors,

And I declare that I am in possession of the said invention and that it is not in use within the Commonwealth of Australia by any other person or persons to the best of my knowledge and belief, and I further declare that the said CONTINA BUREAUX UND RECHENMASCHINENFABRIK AKTIEN-GESELLSCHAFT is not resident within the Commonwealth of Australia,

And I make this declaration conscientiously believing it to be true.

Dated this fifteenth day of June, A.D.1951.

F B Rice

Signed by the said
FREDERICK BERNHARD RICE
in the presence of :

J Waller

To the Commissioner of Patents,
Commonwealth of Australia

2632/51

COMMONWEALTH OF AUSTRALIA

The Patents Act, 1903-50.

STATEMENT OF ADDRESS FOR SERVICE

SIR,

I hereby authorise and request you to send all notices, requisitions, and communications in connexion with my application for Letters Patent for my invention entitled:

"MULTIPLE CALCULATING MACHINE",

to my address: -

Club Chambers,
96 Phillip Street,
Sydney, NSW.
Australia.

F. B. Rice

(FREDERICK B. RICE)

Dated: 15th May 1951

To The Commissioner of Patents,
Commonwealth of Australia

PATENT SPECIFICATION (21) 2632/51

Int. Cl. (51) G06C 15/22

Application Number (21) 2632/51
Lodged (22) 16.5.51

Complete Specification entitled (54) MULTIPLE CALCULATING MACHINE

Lodged (23) 16.5.51
[redacted] (44) ABANDONED
Published (41) 19.7.51
Convention Priority (30) NIL

Applicant (71) FREDERICK BERNHARD RICE

The following statement is a full description of this invention, including the best method of performing it known to ME

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6l 1
Fig 1

ORIGINAL

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The Patents Act 1903-50

COMPLETE SPECIFICATION

"MULTIPLE CALCULATING MACHINE"

I, FREDERICK BERNHARD RICE, of Club Chambers, 96 Phillip Street, Sydney, in the State of New South Wales, Commonwealth of Australia, Patent Attorney, hereby declare this invention and the manner in which it is to be performed to be fully described and ascertained in and by the following statement :-

Twin calculating machines have already been suggested to be built as desk machines. In counter-distinction from these heavy weight machines, the invention relates to a multiple calculating machine of very small size and weight, which according to a preferred embodiment can be held in the hand when in use, and can be kept in any attaché case.

According to the invention two or more small size calculating machines, such as according to the Austrian patents Nos. 747 073/192, 747 074/191, 163 380 and U.S. patent 2 525 352

are arranged in alignment one on top of the others or side by side, to be driven individually or collectively, and capable/ of being switched over, and of having their totalising mechanisms operated and cancelled likewise per se or collectively. With such a universal calculating machine, all the calculation species can be carried out conveniently which can be performed with known calculating machines in a very complicated manner only.

A preferred small size calculating machine combines all the devices contained in the aforesaid patents, and will be referred to / what follows simply as "the minimum-size calculating machine according to Curt Herzstark's system".

In the drawings, three embodiments of a multiple calculating machine constructed according to the invention are shown by way example, to wit:-

Fig. 1 shows a universal calculating machine consisting of two minimum-size calculating machines, in elevation.

Fig. 2 is an associated plan view,

Fig. 3 is a partial longitudinal section through the said twin-machine on a larger scale,

Fig. 4 shows a similar twin-calculating machine with a differently constructed connection of the two effacers, in elevation,

Fig. 5 is an associated plan view,

Fig. 6 is a vertical part-section through the effacer of this twin-machine,

Fig. 7 is a vertical part-section of the machine according to Figs. 1 and 2, on an enlarged scale,

Fig. 8 shows diagrammatically in three different positions, in longitudinal section, a switch-over device for both calculating machines for switching the same over individually or collectively to plus or minus.

Fig. 9 shows a quintuple-calculating machine in front elevation, partly in section,

Fig. 10 shows the quintuple-calculating machine in a diagrammatic plan view,

Fig. 11 shows a detail of the switch-over device for plus and minus of this machine, in lateral elevation,

Fig. 12 shows a further embodiment of the switch-over device, i.e. a detail thereof in vertical elevation, and

Fig. 13 is an associated front elevation.

The minimum size calculating machine according to Curt Herzstark's system is, as well known, a universal calculating machine, i.e.one for all four species, in which all of the entering and totalising elements are arranged in a circle around a single stepped drum 1 (Fig.7). The stepped drum 1 has, in addition to the ordinary stepped set of gear teeth, another complementary set of fixedly arranged gear teeth, the toothed arcs 2 of which are interspersed between the toothed arcs which are provided for additions at equal intervals on the circumference of the drum. Thereby it is made possible to bring at will the ordinary set of gear teeth or the complimentary set of gear teeth into operative position relative to the entering pinions 4, by axial adjustment of the stepped drum, and thus to switch over the machine to additions or subtractions.

In order that the invention may be better understood, the effacer of the machine will be described in brief, which acts on the totalising mechanism as well as on the revolution counting mechanism. It consists of a disc 5 which carries on its underside the effacer gear teeth 6, which act, when effacing, on the element 7 having nine teeth of the transmission pinions 8 which otherwise have ten teeth, and which are in operative connection to the entering pinion 4 through the small cog wheels 9 having five teeth each.

The devices according to the invention which will be described hereinafter show, by way of example,

embodiments which could be constructed alternatively in a way different from that illustrated, particularly as regards the driving and transmission mechanisms.

In the embodiments according to Figs. 1 and 2 as well as according to Figs. 4 and 5, two minimum size calculating machines a, b are provided, wherein the transmission- and totalising elements are arranged in a circle around a central stepped drum in each machine. The body 10 (Fig. 7) of the lower calculating machine a is extended beyond the machine in a central projection 11 serving as a bearing bush, and being rigidly and accurately concentrically connected to the base plate 12 of the lower casing portion of the upper machine b, for example by means of a sleeve 13 and a screw nut 13'. The carriages 14, 14' of the totalising mechanism, which are rotatably arranged on the sleeve shaped projection 11 of the machine body 10, are rigidly connected to one another by an arm 15 of U-shaped cross section opening inwards, so that they can be moved on together by decades after having been lifted off from the cog wheels 9.

In the two twin machines according to Figs. 1 and 2 as well as according to Figs. 4 and 5, each machine can be separately adjusted to the species of calculation desired. For this purpose a switch-over device is provided, which may be of various construction. In the embodiment illustrated (Fig. 7) each machine has its own driving shaft 16, 16', respectively, on each of which a stepped drum 1 is arranged. The driving shaft of the

upper machine b carries the driving crank 17. The two shafts 16, 16' are connected for rotation at their juxta-posed ends by means of a sleeve 18, while being axially shiftable with respect to one another. This connection is effected in such a manner that the shafts 16, 16' slidably engage by means of transverse pins 19, 19', respectively, into longitudinal slots 20 of the sleeve 18. The sleeve 18 is secured against being shifted axially, to wit by means of a pin 21 which is arranged in the sleeve 13 and which engages with its reduced end into a neck 18' of the sleeve 18.

When both machines are adjusted for additions and multiplications, the pins 19, 19' assume the position shown in the middle view of Fig. 8, in which the shaft 16' of the upper machine, b lies with its pin 19' at the inner end of the associated longitudinal slots 20, and the shaft 16 of the lower machine a lies with its pin 19 at the outer end of its associated longitudinal slots 20 of the sleeve 18. By pulling the shaft 16' out and by pressing the shaft 16 in, both machines are adjusted for subtraction and division (Fig. 8, right hand side view), whereas in the position of the shafts 16,16' and 19, 19', respectively, according to Fig. 8, left hand side view, the upper machine is adjusted for addition (multiplication), and the lower for subtraction (division).

The two effacer discs 5, 5' of the twin-machine according to Figs. 1 to 3 carry each on their undersides a toothed rim 23, 23' respectively, the teeth of which

are outside the display openings 24 of the counting 14,14'. In order that the display openings 24 through which the figures of the numeral drums 25 of the totalising mechanisms 14,14' are visible from outside, may not be covered by the toothed rings 23,23', the same have circular-arc shaped openings 26 accurately above the display openings 24. The openings are separated from one another by narrow bridges 26' only, so that the display of the numbers of the counting mechanisms 14,14' is not disturbed by the toothed ring 23,23' respectively. The toothed ring 23' of the upper calculating machine b is positively connected to the toothed ring 23 of the lower calculating machine a by toothed gearing. There are two gear pinions 27,27' respectively, arranged on the ends of a shaft 29 which is rotatably journalled within the hollow arm 15 in brackets 28,28' and which is invisible from outside.

In the embodiment according to Figs. 1 to 3, the upper effacer disc 5' is to be operated as usual by means of a handle 30 which can be tilted inwards when not in use. When operating the effacer disc 5', the rotation thereof is positively transmitted to the lower effacer disc 5 by means of the toothed ring 23'. Thereby the toothed segment 6 which is provided on the underside of each of the effacer discs is brought in a known manner into mesh with the gear pinions 7 of those numbered drums 25 which had been turned out of their zero positions, thereby zeroising the said numeral drums. According to the extent to which the

effacer discs b,b' are turned, the totalising mechanisms only, or the revolution counting mechanisms only, or by a full turn of the effacer discs b,b', all of the counting mechanisms are effaced.

In order that each of the counting mechanisms of the twin-calculating machine may be effaced separately, the connection of the two effacers is detachable, in that e.g. one of the two gear pinions 27,27', preferably the lower one (27), can be disengaged from mesh with the associated toothed ring. In Fig. 3 such a disengaging device is shown by way of example. The gear pinion 27 is arranged by means of a nub 31 axially shiftable on the lower end 29" of the shaft 29, and is coupled therewith for rotation in any known manner, e.g. by a square construction of the end 29" of the shaft. The end 29" of the shaft is terminated on top by a collar 32 which serves as an abutment for a compression spring 33 coiled around the spindle 26. On the other hand, the spring 33 acts on the front face of the gear pinion 27, which is limited in its downward axial movement by the head 34 of a screw arranged in the end of the shaft 29". In the normal position shown, the gear pinion 27 is in mesh with the toothed rim 28. In the end of the nub 31 of the gear pinion 27 a pin-shaped push button 35 is arranged which projects a little with its free lower end from the arm 4b.

When now the upper or the lower counting mechanism is to be effaced separately, pressure is

applied, e.g. by the free thumb of the hand holding the lower machine, on to the lower end of the arm 15 and at the same time on the push button 35, whereby both counting mechanisms 14,14' are disengaged, and at the same time the lower gear pinion 17 is lifted off from the toothed ring 23 of the lower effacer disc 5. In this condition the connection of the two effacer discs is interrupted, and each effacer disc can be operated by itself. The lower effacer disc 5 is set in rotation by the pressure of a finger, similar to a dialling wheel of a telephone, since it has no separate handle. In a twin-machine adapted for the separate effacing of the two counting mechanisms the upper cover of the arm is has to be sufficiently spaced from the upper gear pinion 17' to allow the lifting movement resulting from depressing the button 35.

The twin-calculating machine according to the Fig. 4 to 6 is distinguished from the one as described and shown above merely by a different construction of the coupling device of the two effacer discs 5,5'. In this case the two effacer discs are positively connected to one another by means of a thin endless cord, chain or the like, 36. The cord or chain 36 is passed over a roller or sprocket wheel 37, 37' of the two effacer discs 5,5', respectively, and then via guide rollers 38 through the arm 15. The cord or chain 36 is connected to a handle 36' which is movable in a slot in the arm 15. By shifting the handle 36' both effacer

discs 5,5' are positively operated by means of the cord or chain 38, and according to the extent of turning the same, the totaliser mechanism and revolution counting mechanism are effaced together, or the first or the latter separately.

In order that each machine may be effaced separately, each effacer disc 5,5' can be disconnected from the common operating member 36. Fig. 6 shows an embodiment in which the sprocket wheel ring 37,37', respectively, is arranged loosely rotatable on the effacer disc 5,5', respectively, and is secured against falling off by an inset ring 39 carrying the effacer gear teeth 6. A pin 40, which may be used as a handle, normally engages, under the action of a spring 41, with its reduced lower end 42 into a hole 37" of the sprocket wheel ring 37, and establishes thereby the operative connection between the effacer disc 5 and the sprocket wheel ring 37, so that, by operating the handle 40, both effacer discs 5,5' are operated. However, when the pin 40 is pulled out of the hole 37", the coupling between the sprocket wheel ring 37 is disengaged, whereupon the effacing of the counting mechanism concerned can be effected separately, the pin 40 serving as a handle.

The right connection of the two calculating machines can, if desired, be effected by an arm 43, as indicated in dotted lines in Figs. 1 and 4, which is arranged on the rear ends of the two calculating machines

a, b. As mentioned before, the machines described can be held in the hand when carrying out calculations, and can be kept in an attaché case, owing to their small size and light weight.

It may also be mentioned, that more than two machines can be arranged in alignment on top of one another.

The embodiment illustrated in Figs.9 to 13 shows a multiple calculating machine composed of five complete pocket size calculating machines, which is still much smaller and lighter in weight than the known single calculating machines of ordinary size. The five machines a, b, c, d, e are arranged on the plane base plate 44 of a casing-like pedestal 45 in the disposition of a regular pentagon. In the centre of this pentagon, in a bearing 46 fitted to the base plate 44, a spindle 47 is vertically journalled, which forms the main driving shaft and carries at its upper end a crank 48. At the lower end of the shaft 47, which penetrates into the cavity of the pedestal 45, a spur gear wheel 49 is arranged which meshes with five spur gear wheels 50. The spur gear wheels 50 are attached to the ends of the shafts 51 of the stepped drums which project downward from the casings of the machines. When turning the crank 48, accordingly the spur gear wheel 49 and, by means of the same and via the spur gear wheels 50, the shafts 51 of the stepped drums of all five machines are positively set in rotation.

The counting mechanisms of the five machines can be subjected to decade transfer individually in a normal manner by lifting and turning the counting mechanism carriages. In order to be able to lift the counting mechanisms, if desired, simultaneously from a single point and to subject them to decade transfer, on the main driving shaft 47 a spur gear wheel 53 is arranged idly rotatable which carries a pin 54 projecting downwards, by means of which it is supported in the normal position against a flange 55 of the bearing 46. The pin 54 has a reduced end 56 and engages with the same a hole 57 of the flange 55 whereby the spur gear wheel 53 is secured against rotation in the normal position. The flange 55 has, on a circle, such a number of holes by which decade transfers are possible with the counting mechanisms. Each counting mechanism carriage 58 is provided at the outside of its casing with gear teeth 58 forming a circle, which are laterally open at their lower sides only. The spur gear wheel 53 has a hub 59 extending upward which ends in a handle 60.

In order to effect a transfer of one, or if the calculation requires it, of several decades with all counting mechanisms simultaneously, the spur gear wheel 53 which normally is out of mesh with the gear teeth 58 of the five counting mechanisms, as will be seen in Fig. 3, is lifted by seizing the handle 60. Thereby the spur gear wheel 53 gets into mesh with the five gear wheels 58 and, as the gear teeth thereof are not open

on top, it finds an abutment there. Consequently, when the spur gear wheel 53 is lifted further, all counting mechanisms are lifted there-with, and the transmission pinions 8 (Fig. 7) are put out of mesh with the cog wheels 9. This lifting of the counting mechanisms is limited by abutments (not shown) existing in the individual counting mechanisms anyway. In this condition, the pin 54 is shifted with its end 56 out of the hole 57, and the spur gear wheel 53 is turned so far that the end 56 can engage in the next adjacent hole 57, if a transfer of one decade has to be effected simultaneously for all of the counting mechanisms.

Each of the five counting mechanisms can be effaced individually by turning its disc 5. In order to efface them all at the same time, each effacer disc 5 is provided with gear teeth 61. A spur gear wheel 62 can be put into mesh with these gear teeth 61. The spur gear wheel 62 is arranged idly rotatable on the pin 59 of the spur gear wheel 53, and in the normal position is held in the upper position as indicated in Fig. 3 by a compression spring 63, while abutting on the lower front face of the handle 60. In this normal position the spur gear wheel 62 lies so far above the gear teeth 61 that it does not mesh with the same, when the counting mechanisms are lifted out. When all counting mechanisms are effaced together, the same are firstly lifted out by raising the spur gear wheel 53 by means of the handle 60 in the manner

described hereinabove. Thereupon the counting mechanisms or the carriages 58 thereof, are arrested by a quite small angular turn of the spur gear wheel 53 in the lifted-off position in such a manner that the end 56 of the pin engages into a shallow recess (not shown) on the upper face of the flange 55. After this adjustment the spur gear wheel 62 is brought into mesh with all the gear wheels 61 by depressing the handle 64, and is then set into rotation. By turning the spur gear wheel 62, the totalising-or the revolution-counting mechanisms, or all of the counting mechanisms are effaced. After the effacing is performed, the spur gear wheel 62 returns into the disengaged position under the action of the spring 63, when the handle 64 is released. Thereafter the spur gear wheel 53 is restored to the position as shown in the drawing, whereby the counting mechanisms get again into the engaged position under the action of their springs 65 (Fig. 7).

The multiple calculating machine according to Fig. 7 is moreover provided with a device by means of which all of the individual calculating machines can be switched over simultaneously to additions or subtractions. The device shown in an embodiment by way of example consists of an annular slide 66, which is guided slidably up-and-down on a ring 67, wherein several pins 68 on the ring 67 engage into vertical slots 69 of the annular slide 66. Moreover the annular slide 66 engages with several pins 70 projecting outward into slightly

rising slots 71 of a slide 73 which is rotatably arranged on the cover plate 72 of the pedestal, and engages with pins 74 projecting inward into circular grooves of the hubs 75 of the spur gears 50. In Fig. 9 the five machines are adjusted for additions. When the rotary slide 73 is turned angularly in the sense of the arrow 78 in Fig. 11 by means of a handle 77 projecting laterally from the pedestal 45 the pins 70, and thereby the ring 66 too, are lifted. Thereby the ring 66 adjusts the spindles 51 of the stepped drums axially upward, by means of the pins 74, the complementary sets of gear teeth (Fig. 7) of the stepped drum 1 being placed into juxtaposition to the entering pinions 4, whereby all the machines are adjusted for subtraction.

The spur gear wheels 50 are so wide, that they always keep in mesh with the spur gear wheel 49 on the main driving shaft 47 when the machine is switched over to subtractions or to additions. In order that the machines may be switched over individually to a species of calculations desired, the arrangement is for example made in such a manner that the pin 74 is attached to a slide 73 as will be seen from Figs. 12 and 13, which is vertically shiftable on the ring 66 which is arrested by a spring loaded bolt 80 in its plus-or minus-position. In Figs. 12 and 13 the slide 73, i.e. the respective calculating machine, is in a plus-position. After pulling the bolt 80 out of the

hole 81 of the slide 66, the machine concerned can be switched over to plus or minus by means of the slide 79, unhampered by the other ones. In the minus-position of an individual machine, the pin 80 engages into the upper hole 81. When all calculating machines are to be switched over simultaneously, care is to be taken that all slides 79 are adjusted equally.

In order to be able to operate the entering mechanisms of the five machines comfortably, the pedestal is arranged rotatably on a circular base plate 83. Moreover, the five machines are provided outside the entering mechanisms with a fairing 83 in order to give the machine as a whole a pleasant appearance.

The calculating machines described are suitable for carrying out all species of calculations which can be performed on calculating machines, and the multiple calculating machines are particularly suitable also for those which are not possible on the known calculating machines without further measures. For example, a large number of different terms can be multiplied with one and the same factor in one operation of calculation, such as may occur e.g. in the calculation of exchange rates or when determining the piece costs of goods etc. Moreover, the twin-machine is of great advantage for all calculations of surveyers, since the sine and cosine terms (the coordinates Y and X) can be ascertained at the same time by it.

In what follows, an example will be given, for the calculation of which the multiple calculating machine is of a particular advantage : -

A price list available in Swiss francs is to be converted into the five currencies of Austrian shillings, German marks, Belgian francs, French francs and Swedish kronor, the exchange rates of which are given as follows:

Exchange rates

Swiss francs 100.-	equals	Austrian shillings	677.97
	"	German marks	145.98
	"	Belgian francs	1,152.74
	"	French francs	9,345.8o
	"	Swedish kronor	138.89

Basic prices in Swiss Frs.	Austrian shillings	German marks	Belgian francs	French francs	Swedish kronor
237.45	1,609.84	346.63	2,737.18	22,191.6o	329.79
72.88	494.1o	106.39	840.12	6,811.22	101.22
1,488.55	9,820.73	2,114.59	16,698.o2	135,378.59	2011.89
203.5o	1,379.67	297.07	2,345.83	19,018.7o	282.64
2,415.6o	16,377.o4	3,526.29	27,845.59	225,757.14	3355.o3

The exchange rates are entered into the five entering mechanisms, and the basic prices are entered into all machines simultaneously by turning the handle. For each basic price, the prices in all five currencies can be read off in one go.

It may finally be remarked that the multiple calculating machine may also be provided with an electrical drive.

CLAIMS

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Having now fully described and ascertained the said invention and the manner in which it is to be performed, I declare that what I claim is : -

1. A multiple calculating machine wherein one or more small size calculating machines are combined into a battery of calculating machines having a common drive of the stepped drum spindles, and wherein their counting mechanisms are capable of being switched-over or effaced simultaneously as well as individually.

2. A multiple calculating machine according to claim 1, wherein two small size calculating machines having a common drive of the stepped drum spindles are connected to one another in alignment at a distance, one on top of the other, to a rigid whole, whereby a twin machine is formed, which preferably can be used as a hand machine or be kept in an attaché case.

3. A multiple calculating machine according to claim 1 or to claim 2, wherein the two carriages for the counting mechanisms are rigidly coupled with one another by means of an arm or the like connecting member, so that they can be lifted off together and can be subjected to a decade transfer together.

4. A multiple calculating machine according to any one of the claims 1 to 3, wherein the driving shafts of both machines are connected to one another for rotation, while being axially shiftable relative to one another, by means of a coupling device, whereby each machine per se can be switched-over to the desired species of calculations.

5. A multiple calculating machine according to any one of the claims 1 to 4, wherein the effacers of the two counting mechanisms are positively connected to one another by transmission members, whereby both machines can be effaced simultaneously.

6. A multiple calculating machine according to claim 5, wherein the transmission members can be disconnected alternatively from each effacer, whereby each counting mechanism can be effaced individually, if desired.

7. A multiple calculating machine according to claim 1, wherein several small size calculating machines are arranged on a common base, and wherein the spindles of the stepped drums of all the machines are coupled to a main driving shaft.

8. A multiple calculating machine according to claim 1 or to claim 7, wherein a switch-over device acting on the spindles of the stepped drums of all individual calculating machines is provided, by the operation of which all the spindles of the stepped drums are shifted axially, whereby the normal or the complementary gear teeth thereof are brought into operative position relative to the entering pinions.

9. A multiple calculating machine according to any one of the claims 1,7 or 8, wherein all of the counting mechanisms are capable of being put out of operation individually by hand, or collectively by means of a lifting- and switch-over device, and are capable of performing a decade transfer individuallly as well as collectively.

10. A multiple calculating machine according to any one of the claims 1 and 6 to 9, wherein each counting mechanism is capable of being effaced individually in a well known manner by the turning of an effacer disc, and wherein the counting mechanisms are capable of being effaced collectively by means of a member which can be coupled for rotation to all of the effacer discs.

11. A multiple calculating machine according to any one of the claims 1,7 or 8, wherein further switch-over devices for each individual machine are provided in addition to the switch-over device for all the calculating machines, whereby all machines are capable of being switched-over to plus or minus either collectively or individually.

12. A multiple calculating machine as claimed in claim 1, substantially as described with reference to Figs.1 to 3, 7 and 8 of the accompanying drawings.

13. A multiple calculating machine as claimed in claim 1, substantially as described with reference to Figs. 4 to 8 of the accompanying drawings.

14. A multiple calculating machine as claimed in claim 1, substantially as described with reference to Figs.9 to 11 of the accompanying drawings.

15. A multiple calculating machine as claimed in claim 1, substantially as described with reference to Figs. 9, 10, 12 and 13 of the accompanying drawings.

Dated this 15th day of May, A.D.1951

F. B. Rice

(FREDERICK B. RICE)

Witness: J Walker

DRAWINGS

263251

Fig. 1

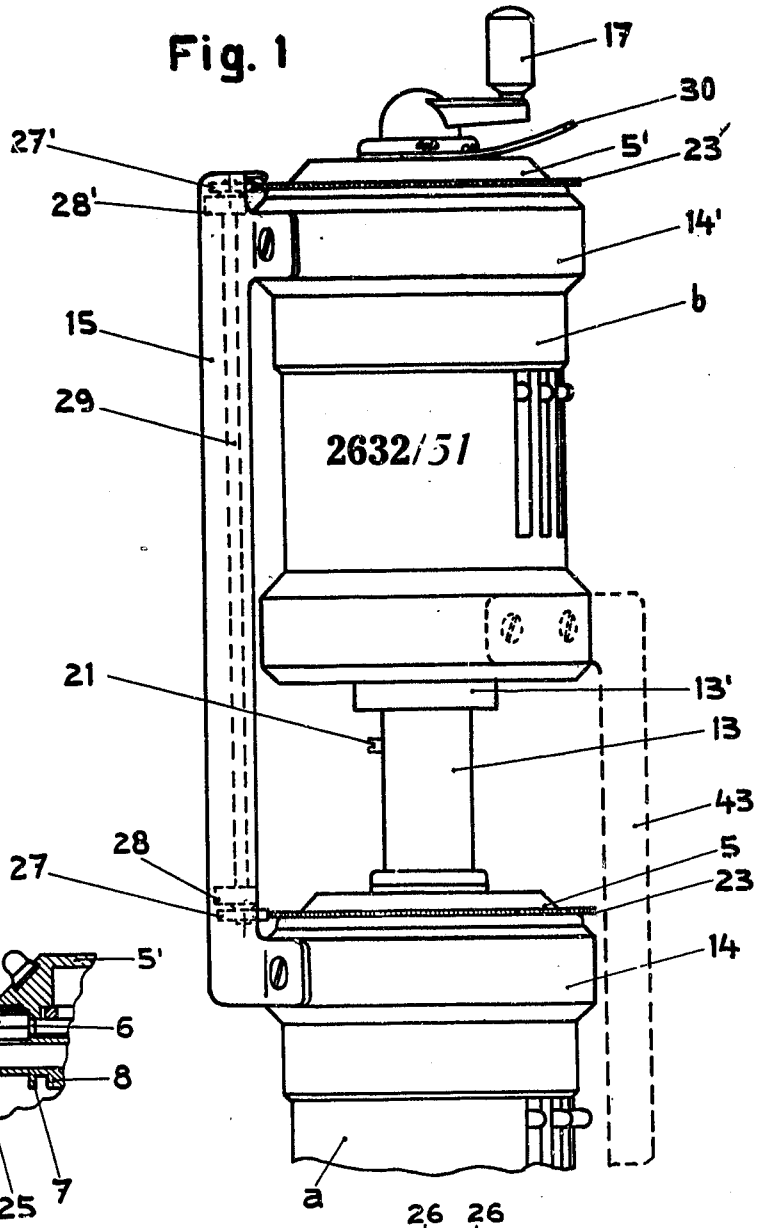


Fig. 3

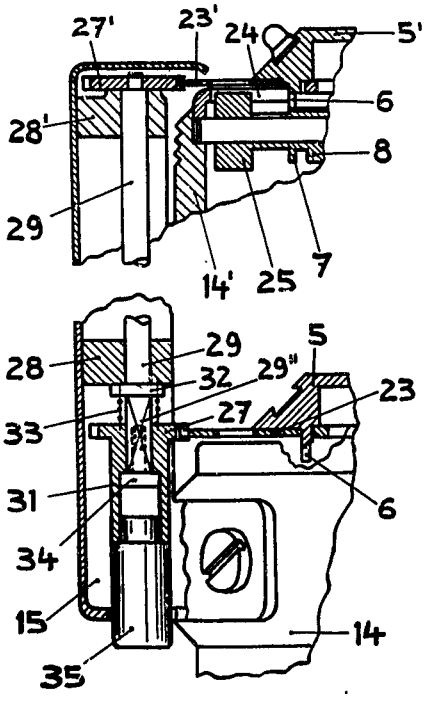
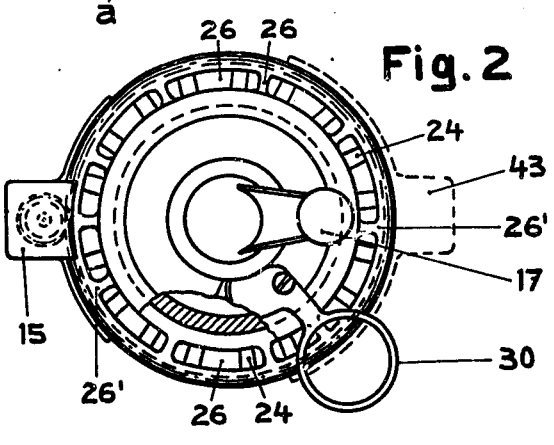


Fig. 2



Frederick B. Rice

(FREDERICK B. RICE)

Fig. 4

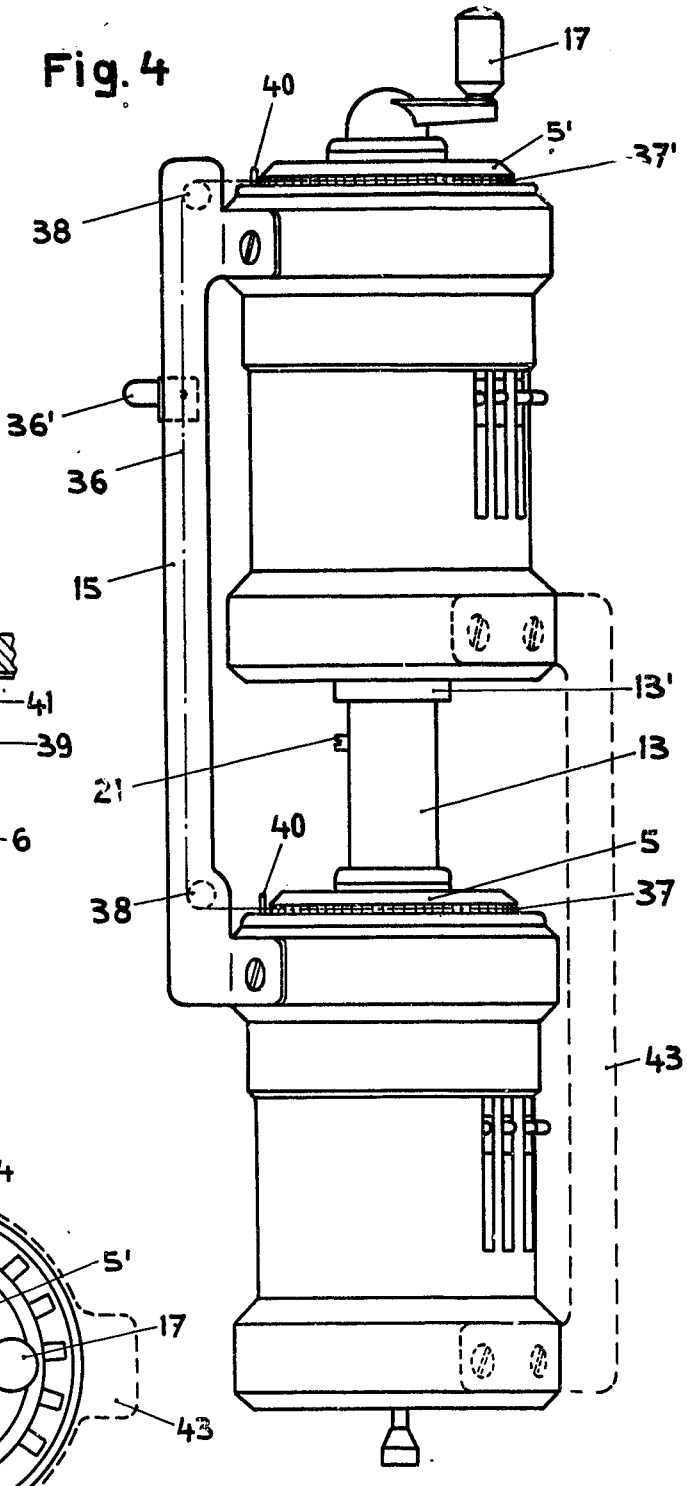


Fig. 6

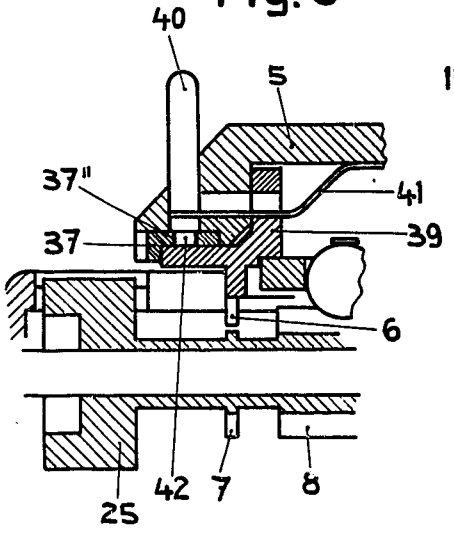


Fig. 5

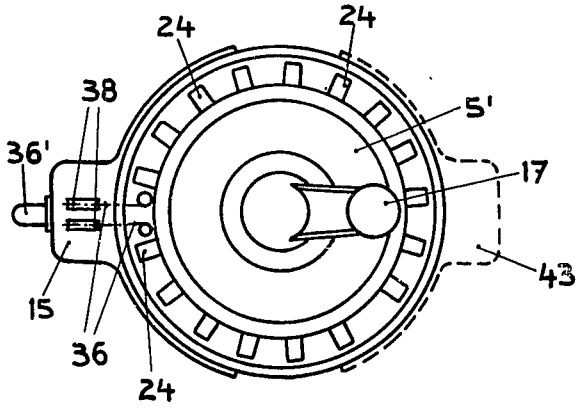


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Fig. 7

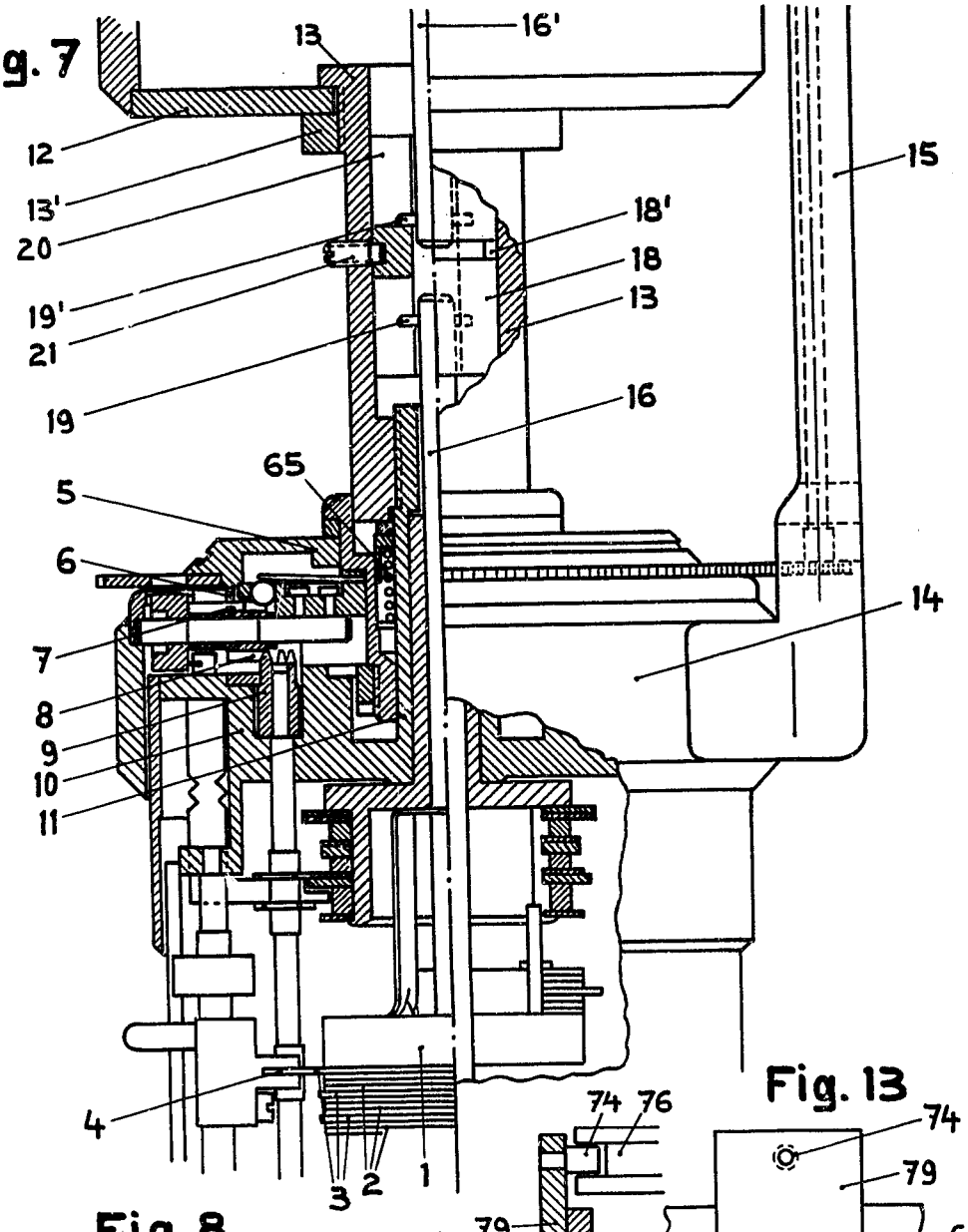

Fig. 8

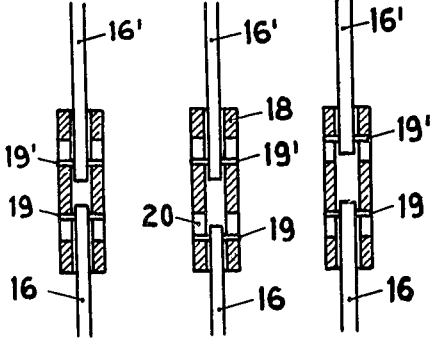

Fig. 12

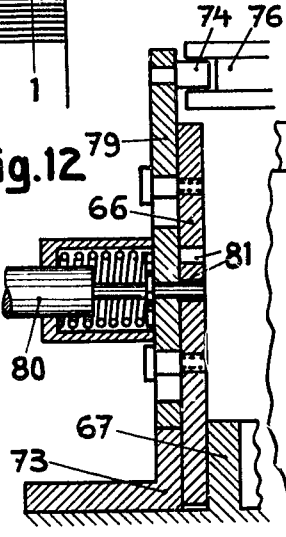

Fig. 13

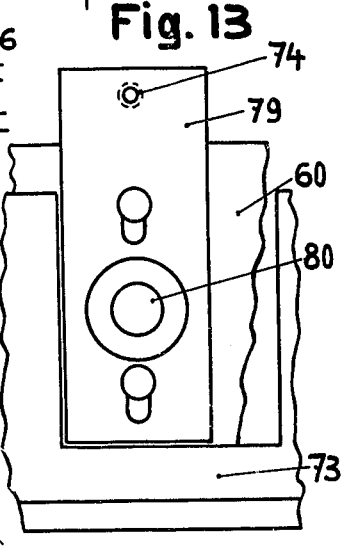

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Fig. 9

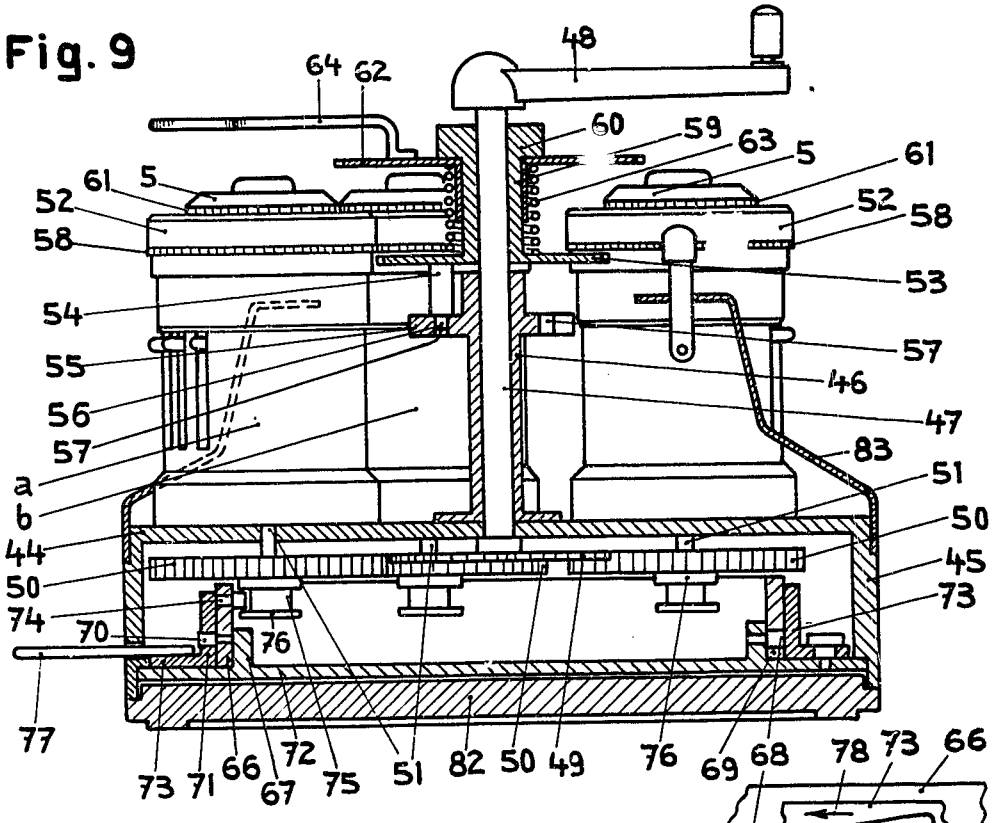

Fig. 10

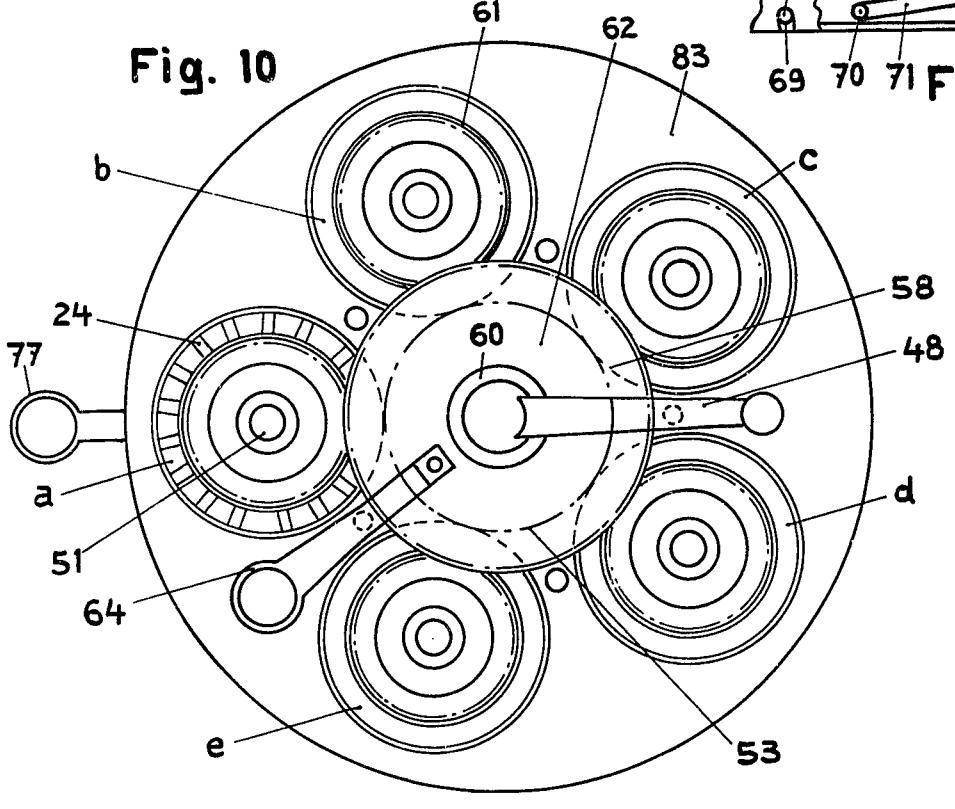

Fig. 11

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END