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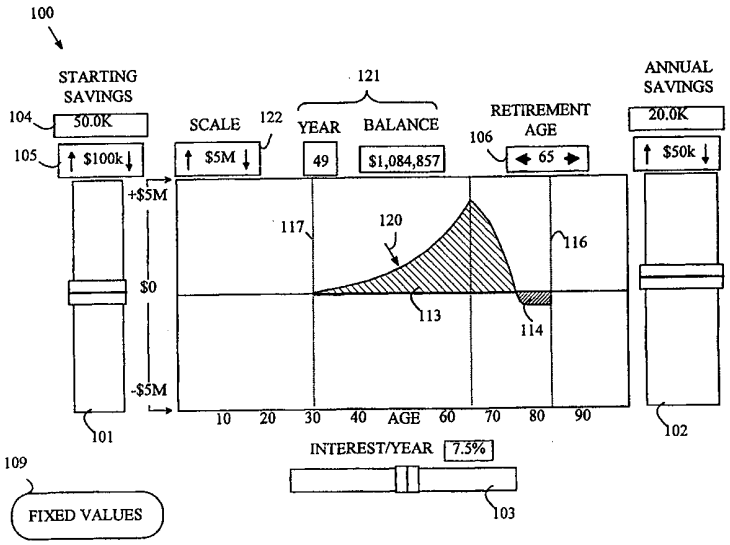

(57) Abstract

A method of operating a computer to provide a financial projection. The computer displays a graph that shows a net asset value (120) as a function of time on a display connected to the computer. The graph includes a difference of an amount in an interest bearing account as a function of time and an expense projection. The expense projection includes expenses adjusted for inflation as a function of time. The amount in the interest bearing account is reduced at each time point by the expenses at that time point. The computer monitors a graphical element (101–103) having a linear dimension representing the magnitude of a first input value affecting the graph. The graph is re–displayed in response to a dectected change in the input value represented by the graphical element.

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Interactive Method for Operating a Computer to Perform Financial Projections

Related Applications

This application is a continuation-in-part of U.S. Serial Number 08/724,088 filed 9/30/96 which is a continuation of U.S. Serial Number 08/222,544 filed 4/4/94 and now abandoned.

Field of the Invention

The present invention relates to computer systems, and more particularly, to financial planning software.

Background of the Invention

The proliferation of private retirement plans such as the popular 401-k and Keogh plans have thrust the burden of retirement planning on the employee. Prior to these portable pension plans, employees worked for the same company for a long period of time and received a pension from that company based on their years of service and salary. There were no investment decisions to be made by the employee. In addition, the employee knew in advance the amount of his or her retirement income, provided he or she remained employed. The problem lay in the assumption that the employee would remain employed long enough to qualify for retirement. In many cases, employees were terminated just short of qualifying for their retirement benefits. Furthermore, the mobility that has characterized modern employment has also rendered such traditional retirement programs obsolete.

While 401-k and similar plans have lessened the problems of the mobile worker with respect to acquiring retirement benefits, these plans present the worker with investment decisions that were not present with company sponsored plans. These plans are typically administered by some entity that offers a variety of investment products, and the worker is faced with the problem of choosing the

product that is appropriate for his or her retirement needs. The product can range from mutual funds in one or more families of funds to investment in individual stocks.

At best, the worker has historical data on the performance of the investment products which are available for his or her plan. Based on these estimates, the worker's projected needs at retirement, and some estimate of his or her possible range of annual contributions, the worker is supposed to make an intelligent decision. Accordingly, it would be advantageous to provide software that would allow a person having little or no previous education in investing to be able to project his/her financial situation under relatively simple investment scenarios.

As investors become more sophisticated in financial planning, the computational aspects of their plans become more complex. Simple financial planning software is no longer adequate. Accordingly, it is advantageous to provide software that will allow the investor to add more complex financial calculations without having to re-learn the portion of the computations which was adequately handled by the original software.

Broadly, it is the object of the present invention to provide an improved financial planing package for personal computers and the like.

It is a further object of the present invention to provide a financial planning package that can be modularly augmented to provide more sophisticated financial projections.

These and other objects of the present invention will become apparent to those skilled in the art from the following detailed description of the invention and the accompanying drawings.

Summary of the Invention

The present invention is a method of operating a computer to provide a financial projection. The computer displays a graph that shows a net asset value as a function of time on a display connected to the computer. The graph includes a difference of an amount in an interest bearing account as a function of time and an expense projection. The expense projection includes expenses adjusted for inflation as a function of time. The amount in the interest bearing account is reduced at each time point by the expenses at that time point. A graphical element that includes a linear dimension representing the magnitude of a first input value affecting the graph is monitored by the computer. The graph is re-displayed in response to a detected change in the input value represented by the graphical element.

Brief Description of the Drawings

Figure 1 is the display as seen by a user of the present invention.

Figure 2 is another example of the display screen.

Detailed Description of the Invention

The manner in which the present invention gains its advantages may be more easily understood with respect to a planner for a simple savings account model for a retirement plan. After this model is explained, the manner in which additional levels of complexity can be added will be explained in more detail.

The retirement account model is based on an account having a starting balance, an expected interest rate, an expected retirement age, a retirement annual payment, and an annual savings up until the time of retirement, and an annual withdrawal in retirement. The output of the model is a graph of the account's balance less the funds needed to pay the current expenses indexed for inflation. The model assumes that the account increases until retirement and is then drawn down to the end

of the period specified by the user. To simplify the input of the variables, graphical sliders are provided for key input variables. Each time a variable is altered, the graph is re-computed and displayed.

The operation of this aspect of the present invention may be more easily understood with reference to Figure 1, which is the display 100 presented to the user. The key input variables are provided on sliders. The variables controlled by four sliders in this embodiment are the balance 101 in the user's account at the start of the model, the annual savings 102 that are to be added to the account, the user's anticipated retirement age indicated by 106, and the interest rate 103 that is earned on the savings in the account.

The value entered by each of the sliders is shown above or inside the slider. For example, the starting savings is shown at 104 over slider 105. On sliders that may have a very large range, a scale slider is also provided as shown at 105. The value on the scale slider is altered by clicking on the arrows in the slider. The scale slider sets the maximum range for the corresponding slider.

Additional variables are entered by filling in panels in a table. The table is accessed by clicking on the parameter button 109. Variables that are used in the model, but not changed by the sliders include the person's life expectancy, which is shown graphically at 116, the person's age at the start of the savings plan, shown graphically at 117. In addition, the rate of inflation, user's tax bracket, the desired income during retirement in current dollars, and the tax treatment of the savings are also entered via this table.

Referring again to Figure 1, each time the setting of a slider is changed, a graph which shows the balance in the savings account is updated on the computer screen. This graph indicates the account balance as a function of the year through the user's expected date of death less the sums needed to pay the expenses in that year. The sums needed to pay expenses take into account the inflation-adjusted value of the anticipated expenses and the tax bracket of the user at the time of withdrawal. If the graph falls below zero as shown at 114, the user will have a short fall during

retirement. If the graph remains above zero as shown at 113, then at death as shown at 116, the user will have a surplus toward a bequest. If the graph goes below zero shown at 114, then the user will have a deficit. The graph value at any age can be determined by placing the cursor 120 at that age and reading the year and balance in the windows shown at 121.

In general, a person who is planning his or her retirement wishes to "play" with the assumptions to determine the best way to meet his or her retirement goals. The sliders, or other graphical "widgets", provide a fast and convenient method for changing the assumptions and immediately seeing the result of the changes. For example, the user can quickly determine the effect of retiring earlier or later by clicking the arrows on either side of the retirement age widget. In the example shown in Figure 1, the user runs out of money before the user's anticipated date of death. The user could remedy this situation in any of a number of ways. For example, the user could invest the sums in the account in more risky investments to gain a higher rate of interest. The interest rate needed to reach the user's anticipated date of death can be determined by moving the interest rate slider until the curve reaches zero at the anticipated date of death as shown in Figure 2 at 120. Alternatively, the user could alter the retirement age, annual savings, or initial savings to accomplish the same goal. The present invention allows the user to quickly explore each of these possibilities to determine the best plan consistent with the user's goals.

While the model discussed above provides a simple interface for a user lacking mathematical expertise to explore his or her retirement investments and needs, it is clear that this model only deals with one simple investment scenario. In general, a user may have both tax deferred and normal investments for which the taxes have already been paid. In addition, the tax treatment of various tax-deferred investments may be different. For example, the sums in the accounts may be subjected to ordinary income tax, capital gains taxes, withdrawal penalties, etc. In addition, the interest earned on each investment may be different.

On the expense side, the user has many more future expenses than just retirement. A user may need to plan for college costs for each of his or her children, the replacement cost of an automobile, the future cost of health insurance, etc. Each of these expenses may be subject to a different rate of inflation.

Accordingly, a structure is needed that allows all of this complex data to be entered in a manner that is user friendly and easily comprehended by users having little or no financial training or mathematical expertise. The manner in which the present invention accomplishes this will now be explained in detail.

The graph shown in Figure 1 is really the combination of two curves, one representing money in an account and one representing anticipated expenses adjusted for inflation. The curves are combined by converting sufficient money from the account to after tax dollars to pay the expenses. In a general system according to the present invention, a number of graphs of these types are combined to provide the user with a final financial picture. Each graph deals with one specific investment or anticipated expense. Hence the user needs only deal with relatively simple problems that he or she has already considered. The present invention then combines the graphs to provide the user with a picture of all of his or her investments and expenses.

In the preferred embodiment of the present invention, the data needed to generate each graph is specified in a separate window on the computer display. This window provides a display graph that allows the user to "play" with the various parameters of the graph. The individual graphs are then combined to provide the user with a combined graph similar to that discussed above.

The expense graphs are modeled on an inflation-adjusted model of a present expense in a manner similar to the retirement income expense discussed above. The user specifies a starting date, ending date, amount of the expense in today's dollars. The user then specifies an inflation rate to be associated with this expense. The program then generates a future expense curve showing an expense starting on the starting date of an amount adjusted for inflation at the anticipated rate. The expense

curve returns to zero at the year after the ending date. Since the inflation rate can be set to zero, this model also handles cases involving expenses that are constant in time. If an expense is tax deductible, the user needs to enter the net expense after any "rebate" generated by the deduction.

An investment graph is likewise modeled on the investment model discussed with reference to Figure 1. The graph has a starting date, interest rate, starting amount, annual increment, and tax treatment. The tax treatment has two components. The first is the tax treatment of the interest earned each year. This is preferably specified by a tax rate. The second component is the tax rate and penalty, if any, at withdrawal.

A third type of graph element represents income. This can be salary from a job, gifts from relatives, or the conversion of an investment. If the graph is coupled to an investment graph, then the amount in the investment must be reduced to compensate for the income generated. This type of graph element is inherent in the investment model discussed with reference to Figure 1.

A loan may be viewed as present income followed by an expense (the loan payments). The amount of the expense will depend in some cases on the tax treatment of interest. In addition, the type of loan repayment structure must be specified, i.e., fully amortized loan, interest only, etc. However, this type of element is still reducible to an income graph representing the loan principle being paid to the borrower and an expense graph of the type discussed above.

The manner in which the graphs are "combined" will now be discussed in more detail. The problem faced by the user is to pay his or her future expenses from his or her investments or anticipated current income. This may require a transfer of assets from the investments to cover the expenses. The income element discussed above provides this transfer. Each investment has an income element coupled to it for providing the conversion. While this would seem to be a relatively straightforward problem, the optimal solution for each investor depends on a number of factors

because of the different tax treatments of his or her various investments. Hence, the present invention allows the user to specify how the investments are to be used to pay the expenses. In the simplest model, the user specifies the order in which the investments will be used to pay the expenses and a minimum account balance for each account so that the payment does not remove any particular investment.

The preferred embodiment of the present invention is practiced on a conventional digital data processing system. However, it will be obvious to those skilled in the art from the preceding discussion that the method of the present invention can be practiced on any computational platform with the requisite memory and computing power.

Various modifications to the present invention will become apparent to those skilled in the art from the foregoing description and accompanying drawings. Accordingly, the present invention is to be limited solely by the scope of the following claims.

WHAT IS CLAIMED IS:

1. A method of operating a computer to provide a financial projection, said method comprising the steps of:

displaying a graph comprising net asset value as a function of time on a display connected to said computer, said graph comprising the difference of an amount in an interest bearing account and an expense projection, said expense projection comprising expenses adjusted for inflation as a function of time, said amount in said interest bearing account being reduced by said expenses;

displaying a graphical element comprising a symbol having a linear dimension representing the magnitude of a first input value affecting said graph, said magnitude being changeable by using a pointing device to manipulate a specified region on said graphical element thereby changing said linear dimension, said graphical element being displayed on a display screen connected to said computer;

repetitively monitoring said graphical element to detect a change in said graphical element; and

re-displaying said graph on said display screen in response to said detected change in said input value represented by said graphical element.

2. The method of Claim 1 further comprising the step of displaying a form on said display screen for entering a second input value affecting said graph.

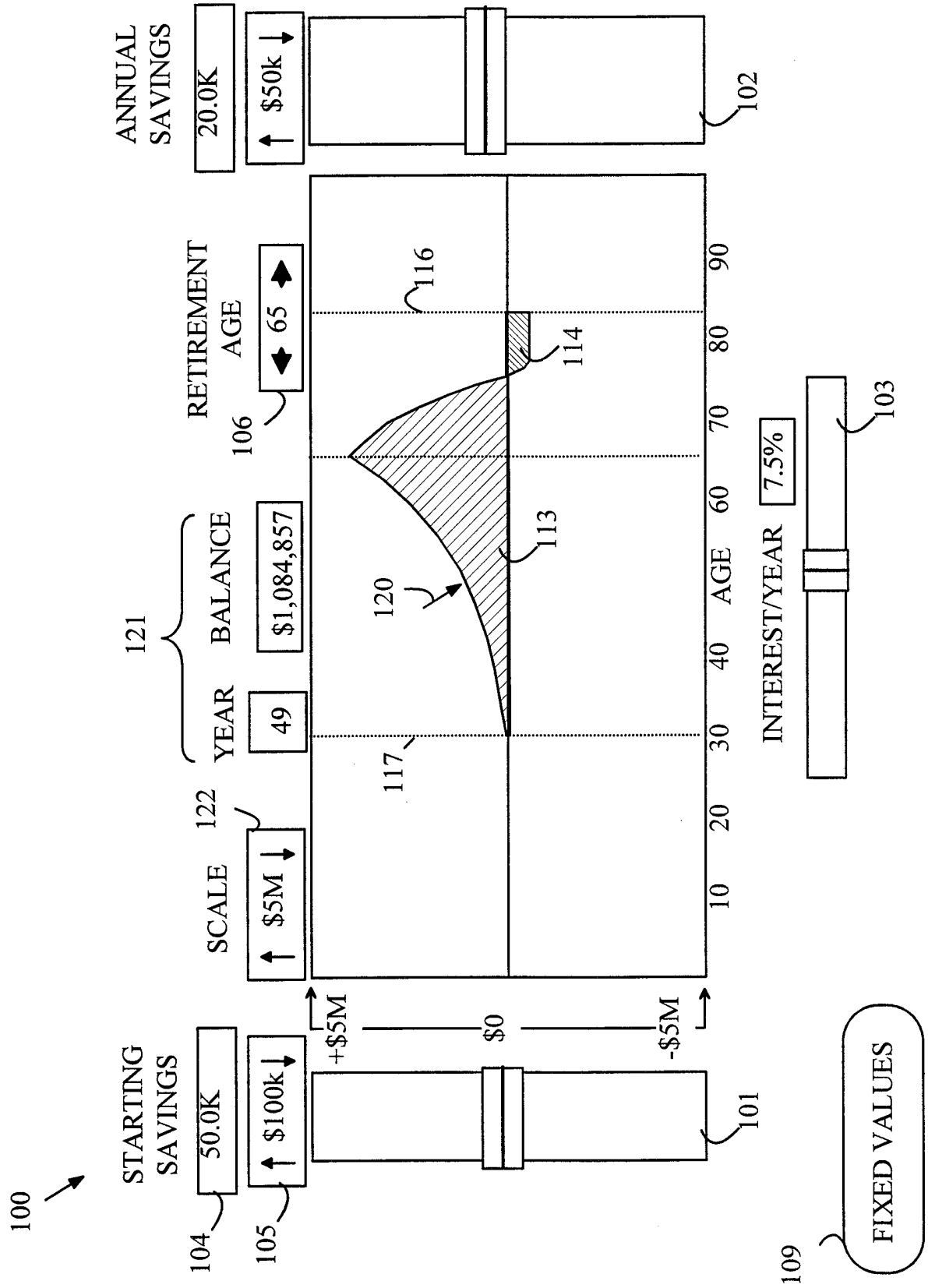
3. The method of Claim 1 wherein said first input value determines the amount in said interest bearing account at a specified time.

4. The method of Claim 1 wherein said first input value determines the interest paid on a principle in said interest bearing account.

5. The method of Claim 1 wherein said first input value determines a time at which said expense projection begins.

6. The method of Claim 1 wherein said first input value determines an amount to be added to said account periodically.

7. The method of Claim 1 wherein said graph of said amount in said interest bearing account is further reduced by an amount equal to income tax due on an income equal to said expenses.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RETIREMENT AGE
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114
113
120
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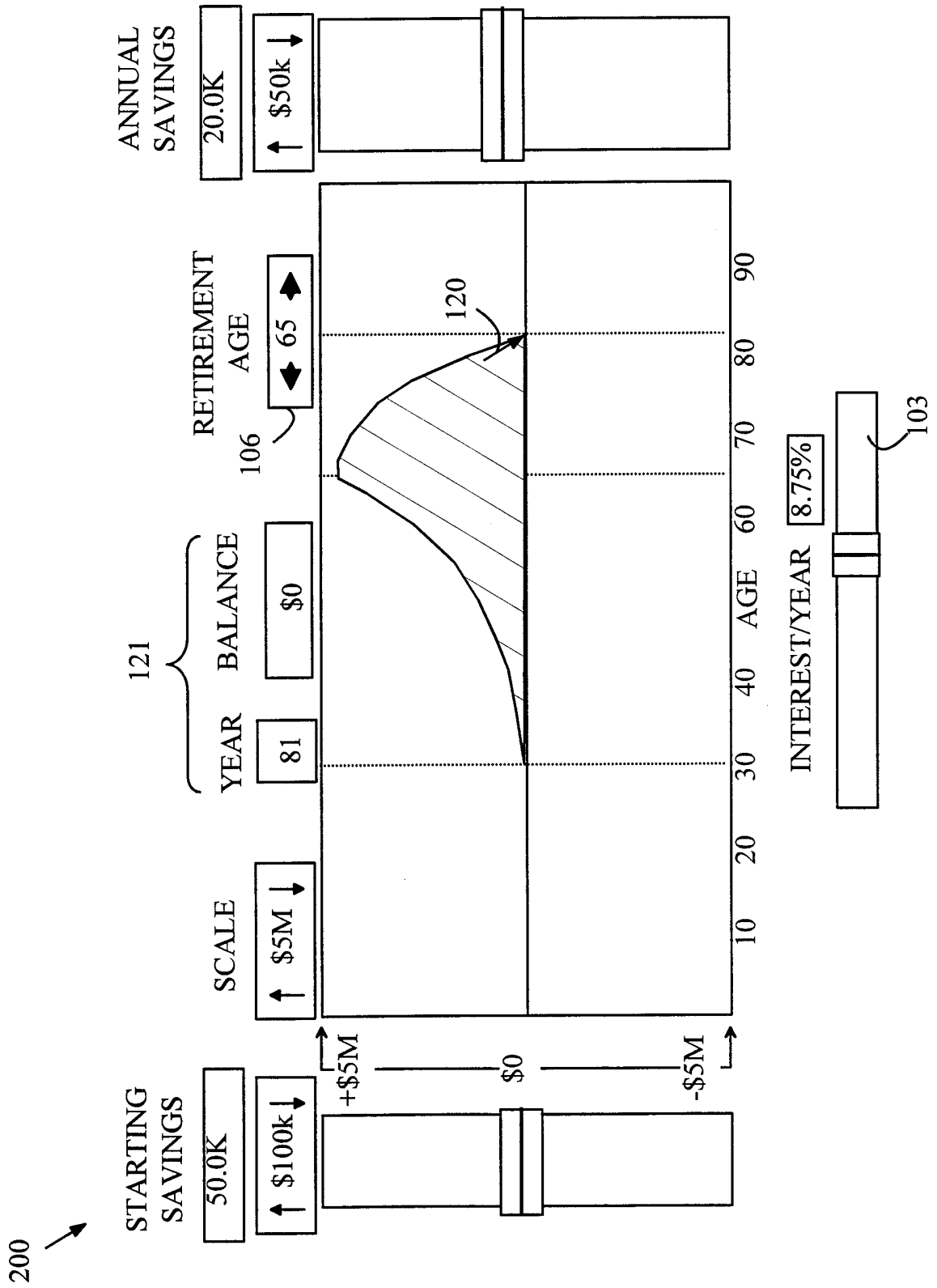
AGE
INTEREST/YEAR
7.5%
103
109
FIXED VALUES

FIGURE 1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$100k
+$5M
$0
-$5M
SCALE
$5M
121
YEAR
81
BALANCE
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106
RETIREMENT AGE
65
120
ANNUAL SAVINGS
20.0K
$50k
10
20
30
40
60
70
80
90
AGE
INTEREST/YEAR
8.75%
103

FIGURE 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/22423

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :G06F 17/00
US CL :705/35, 36

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/35, 36

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

STN, DIALOG
search terms: financial planning or projection, graph, future value, interest rate

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	US 5,956,691 A (POWERS) 21 September 1999, col. 2, line 51 to col. 4 line 14, figure 3.	1-7
A,E	US 6,012,044 A (MAGGIONCALDA et al) 04 January 2000, abstract.	1-7
Y,P	US 5,884,283 A (MANOS) 16 March 1999, see detailed description.	1-7
Y,P	BELL, J.H. et al. A graphical approach to retirement and estate planning Journal of Financial Service Professionals. November 1998. Vol 52. N.6. pages 72-81.	1-7
Y	US 5,247,651 A (CLARISSE) 21 September 1993, see abstract.	1-7

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/22423

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,802,500 A (RYAN et al) 01 September 1998, see detailed description.	1-7
Y,E	US 5,991,744 A (DICRESCE) 23 November 1999, see abstract and detailed description.	1-7