

Jan. 12, 1926.

G. T. MALAN

MEANS OF COMPUTATION

Filed April 2, 1925

1,569,770

HOLD-HERE CLEAN CARD PREVENTS MISTAKES														
NAME		NO.		DEPT.										
Doer		50		Pack.										
CLOCK TIME RECORD	MON. TUES. WED.	THUR. FRI. SAT.	NO. OF CARDS-- FOR WEEK ENDING 10/21											
9-0	1.35	1.80	2.70	5-21										
8-9	1.33	1.78	2.67	5-12										
8-8	1.32	1.76	2.64	5-03										
8-7	1.30	1.74	2.58	4-94										
8-6	1.29	1.72	2.55	4-85										
8-5	1.27	1.70	2.52	4-76										
8-4	1.26	1.68	2.49	4-67										
8-3	1.24	1.66	2.46	4-58										
8-2	1.23	1.64	2.43	4-49										
8-1	1.21	1.62	2.40	4-40										
8-0	1.20	1.60	2.37	4-31										
7-9	1.18	1.58	2.34	4-22										
7-8	1.17	1.56	2.31	4-13										
7-7	1.15	1.54	2.28	3-94										
7-6	1.14	1.52	2.25	3-85										
7-5	1.12	1.50	2.22	3-76										
7-4	1.11	1.48	2.19	3-67										
7-3	1.09	1.46	2.16	3-58										
7-2	1.08	1.44	2.13	3-49										
7-1	1.06	1.42	2.10	3-40										
7-0	1.05	1.40	2.07	3-31										
6-9	1.03	1.38	2.04	3-22										
6-8	1.02	1.36	2.01	3-13										
6-7	1.00	1.34	1.98	2-94										
6-6	.99	1.32	1.95	2-85										
6-5	.97	1.30	1.92	2-76										
6-4	.96	1.28	1.89	2-67										
6-3	.94	1.26	1.86	2-58										
6-2	.93	1.24	1.83	2-49										
6-1	.91	1.22	1.80	2-40										
6-0	.90	1.20	1.77	2-31										
5-9	.88	1.18	1.74	2-22										
5-8	.87	1.16	1.71	2-13										
5-7	.85	1.14	1.68	1-94										
5-6	.84	1.12	1.65	1-85										
5-5	.82	1.10	1.62	1-76										
5-4	.81	1.08	1.59	1-67										
5-3	.79	1.06	1.56	1-58										
5-2	.78	1.04	1.53	1-49										
5-1	.76	1.02	1.50	1-40										
5-0	.75	1.00	1.47	1-31										
4-9	.73	.98	1.44	1-22										
4-8	.72	.96	1.41	1-13										
4-7	.70	.94	1.38	1-04										
4-6	.69	.92	1.35	1-23										
4-5	.67	.90	1.32	1-14										
4-4	.65	.88	1.29	1-05										
4-3	.64	.86	1.26	1-24										
4-2	.63	.84	1.23	1-15										
4-1	.62	.82	1.20	1-06										
4-0	.61	.80	1.17	1-25										
3-9	.60	.78	1.14	1-16										
3-8	.59	.76	1.11	1-07										
3-7	.58	.74	1.08	1-28										
3-6	.57	.72	1.05	1-19										
3-5	.56	.70	1.02	1-10										
3-4	.55	.68	1.00	1-31										
3-3	.54	.66	.97	1-22										
3-2	.53	.64	.94	1-13										
3-1	.52	.62	.91	1-04										
3-0	.51	.60	.88	1-25										
2-9	.50	.58	.85	1-16										
2-8	.49	.56	.82	1-07										
2-7	.48	.54	.79	1-28										
2-6	.47	.52	.76	1-19										
2-5	.46	.50	.73	1-10										
2-4	.45	.48	.70	1-31										
2-3	.44	.46	.67	1-22										
2-2	.43	.44	.64	1-13										
2-1	.42	.42	.61	1-04										
2-0	.41	.40	.58	1-25										
1-9	.40	.38	.55	1-16										
1-8	.39	.36	.52	1-07										
1-7	.38	.34	.49	1-28										
1-6	.37	.32	.46	1-19										
1-5	.36	.30	.43	1-10										
1-4	.35	.28	.40	1-31										
1-3	.34	.26	.37	1-22										
1-2	.33	.24	.34	1-13										
1-1	.32	.22	.31	1-04										
1-0	.31	.20	.28	1-25										
0-9	.30	.18	.25	1-16										
0-8	.29	.16	.22	1-07										
0-7	.28	.14	.19	1-28										
0-6	.27	.12	.16	1-19										
0-5	.26	.10	.13	1-10										
0-4	.25	.08	.10	1-31										
0-3	.24	.06	.07	1-22										
0-2	.23	.04	.04	1-13										
0-1	.22	.02	.01	1-04										
0-0	.21	.00	.00	1-25										
0-9	.20	.00	.00	1-16										
0-8	.19	.00	.00	1-07										
0-7	.18	.00	.00	1-28										
0-6	.17	.00	.00	1-19										
0-5	.16	.00	.00	1-10										
0-4	.15	.00	.00	1-31										
0-3	.14	.00	.00	1-22										
0-2	.13	.00	.00	1-13										
0-1	.12	.00	.00	1-04										
0-0	.11	.00	.00	1-25										
0-9	.10	.00	.00	1-16										
0-8	.09	.00	.00	1-07										
0-7	.08	.00	.00	1-28										
0-6	.07	.00	.00	1-19										
0-5	.06	.00	.00	1-10										
0-4	.05	.00	.00	1-31										
0-3	.04	.00	.00	1-22										
0-2	.03	.00	.00	1-13										
0-1	.02	.00	.00	1-04										
0-0	.01	.00	.00	1-25										
0-9	.00	.00	.00	1-16										
0-8	.00	.00	.00	1-07										
0-7	.00	.00	.00	1-28										
0-6	.00	.00	.00	1-19										
0-5	.00	.00	.00	1-10										
0-4	.00	.00	.00	1-31										
0-3	.00	.00	.00	1-22										
0-2	.00	.00	.00	1-13										
0-1	.00	.00	.00	1-04										
0-0	.00	.00	.00	1-25										

Patented Jan. 12, 1926.

1,569,770

UNITED STATES PATENT OFFICE.

GORDON T. MALAN, OF PHILADELPHIA, PENNSYLVANIA.

MEANS OF COMPUTATION.

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To all whom it may concern:

Be it known that I, GORDON T. MALAN, a citizen of the United States, residing at Philadelphia, State of Pennsylvania, have invented a new and useful Means of Computation, of which the following is a specification.

My invention relates to a new and useful method of calculation and novel means therefor, whereby the computation of certain factors in the production of any article of manufacture, is greatly expedited, with a considerable saving in both the time and labor heretofore required for such calculation.

My invention relates more particularly to a novel method of calculating such factors in the production or manufacture of an article, as are dependent upon the time element involved in the production of the article, or in the individual operation, step or process in the manufacture of the same. Thus for instance the first factor primarily concerning every manufacturer or production manager, is that of labor cost on a particular article, or the labor cost on each step or operation in the manufacture of that article. Another important factor which is dependent upon the time element, is the overhead cost on each article manufactured, or, as the case may be, the overhead corresponding to each operation or step in the manufacture of the same.

Still other factors which are very useful in the production of an article, are those factors which enable a manager to check up not only costs of labor and over-head of the article manufactured, but also permit the checking up of the rate of production maintained on a particular article or on each operation in the manufacture thereof.

Since each of these factors is dependent primarily upon one common element, that is, the time consumed in the production of the complete article, or the time consumed in the carrying out of the individual steps or operations in the manufacture thereof, I have devised the novel method of calculation and certain novel means therefor, described in detail hereinafter, whereby, with the aid of a single time card properly columnized and ruled and having suitable spaces for receiving time stampings or punchings from any suitable time recording clock, a suitable time scale laid out along the edge or edges of the time card, or on

another card if desired, and a corresponding factor chart or table having a similar time scale co-operating therewith, and having various columns corresponding to the different fixed or known factors such as the fixed hourly wage rate or the fixed hourly over-head charge, calculated on an hourly or other time interval basis, or on the particular department or machine employed to carry out the particular step in the manufacture, which forms the subject matter of the calculation, I may calculate such cost or production factors direct from the time consumed.

Thus with the aid of my novel card, the time scale and factor chart or table, I may calculate directly from the various time punchings and from the number of articles produced in any interval of time, the over-head charged to the particular operation or job as well as the cost labor on that particular job, or the rate of production.

One of the particular uses to which my novel method and means of computation, is well adapted, is the calculation of the labor cost on an article, on an individual operation or step in the manufacture thereof, on the combination scheme of wage setting, so often employed in manufacturing establishments, whereby the wages are set partly on a time basis and partly on a piece work basis. That is, the employee receives an hourly rate which is guaranteed to him regardless of his output, and receives in addition to said hourly rate one half of his hourly rate for the time which is saved in performing a particular amount of work, within a given amount of time, as gauged by a predetermined rate of production.

This system of wage setting, commonly known as the "time-bonus" plan, is particularly made easy by my novel method, thereby providing means not only of calculating the labor cost on a particular article, but also calculating the cost of each operation, as well as calculating the pay roll for each employee, figured on such "time-bonus" plan; in a far more expedient and accurate manner than has been possible heretofore in manufacturing establishments employing any such combination wage setting scheme; since it eliminates by far the greater portion of the clerical work ordinarily incident to such calculation.

Thus, if an operator receiving 40¢ per hour, in one hour's time, completes one and

a half-hours' work, as based on a predetermined production rate of the particular operation, then he receives in addition to the time wage of 40¢, a fraction of said wage, at the same hourly rate, for the amount of time saved in that hour. The other fraction of this saved hourly wage, accrues to the management, thereby making it possible for the management to guarantee the workman, in addition to his hourly rate, a certain production rate and bonus scale, which it will maintain regardless of the total wages of the employees; since with each saving in the time required to perform an operation, the management as well as the employee benefits, thus providing a constant initiative, for the employee to produce a maximum number of pieces, since with each piece produced above the rate originally fixed, he increases his earnings above the minimum or the hourly rate. The system most widely adopted for figuring this bonus or extra hourly rate for time saved, as figured by a production rate, has been a 50% plan which gives the results of such extra efforts of the particular employee, one half to the employee and one half to the management, whereby the management is enabled to maintain a constant wage rate scale as well as production rate scale, regardless of the total earnings of the employee.

However, this system of bonus however, or the equal participation by the employee and the management in the results of the diligence and co-operation of the employee and the management, in raising the efficiency of work, has not been adopted universally, in spite of its desirability and its many advantages, due to the great amount of clerical work involved in the calculation and figuring of the wages for each employee, since the cost of such additional clerical work often off-sets any advantages resulting from such scheme, in the lowering of the cost or in the increasing of the output. It is one of the several objects of my invention, to provide a method and means for calculating the wages of each employee on such a combined "time-bonus" plan, with the elimination, of by far the greater portion, of the clerical work otherwise involved, and the corresponding expense incident thereto.

With the above and other ends in view, my invention consists of a novel method, whereby, I provide upon a time card, a horizontal row for each job or task, said horizontal row having a space for punching the finishing time of the job, which is usually taken as the starting time of the next succeeding job, and it also contains spaces for the serial number or other identifying mark of the particular operation, as well as spaces for the production rate, the number of pieces completed in the particular amount of time, the resulting saving or loss of time, for the

given production rate, or the extra work which the employee was able to put out, above said rate, in the given time taken for the job, and also a space for the results of the calculation. I further provide on the time card along the vertical edge or edges thereof, a time scale, having graduations of "time", such graduations extending over such suitable period of time as normally constitutes a working day; that is, approximately from 7.30 in the morning to 5.00 o'clock in the afternoon.

My invention further consists of a factor chart or table, having horizontal rows of the same spacing as the time graduations along the edge of the time clock-card, and having spaces in said horizontal rows, arranged in vertical columns, showing the accumulative "factor" number, (such as wages or labor cost) for each elapsed period of time; each vertical column of such factors being for different predetermined hourly rates of wages per man, or over-head per machine, etc., depending on the nature of the tabulated "factor" numbers. Thus, in the illustration shown in the drawings, the tabulated numbers represent the progressive bonus wage quantities corresponding to the hourly rates of 30¢, 40¢, and 60¢ per hour, per man.

My invention further consists of other novel details as will be brought out more fully in the following description and the accompanying drawings, and set forth more particularly in the appended claims.

For the purpose of illustrating my invention, I have shown in the accompanying drawings forms thereof which are at present preferred by me, since they will give in practice satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

The accompanying drawing, in which like reference characters indicate like parts or elements, represents a plan view of a "factor" chart or table and time clock card superimposed thereon, embodying my invention.

Referring to the drawing, 1 designates the clock or time card, made preferably of a relatively stiff sheet of paper or a thin paste board and having the rulings thereon as shown in the drawings. Thus, the time graduations 2 are placed along the vertical edges thereof. Adjacent to one of the vertical edges, is a vertical column 3, provided for the clock or time punchings, giving the day of the month, and time of the day in hours and tenths of hours, or in any other uniform divisions of time. The initial

time mark punched at the beginning of the day, let us say at 7.30 in the morning, is placed in a separate space 25, standing alone and above the top of the "time" column 3, and each successive time mark or punching thereafter, designates the finishing time, of the particular "job" recorded in the same horizontal line, and also designates the starting time of the next succeeding "job" recorded in the line below.

Adjacent to the time record column 3, I provide a vertical column of spaces 4, in each horizontal "job row", for the notation of the quotient, of the number of pieces completed, divided by the predetermined hourly production rate. The next vertical column 5, is for the serial number of the particular job or operation, for the purposes of identification, and for future reference, in undertaking a study of the rate of production. In the next vertical column 6, I mark the number of pieces completed, after which I provide a vertical column 7, for the hourly production rate on the particular "job", whose serial number has been noted, and lastly I provide a column 8 for noting the results of the calculation as taken from the "factor" chart or table. I may further provide one or several additional columns of spaces, such as column 9, for the purpose of noting the results of any other calculation or factors, taken from the same or other chart, dependent upon the same periods of time recorded in the time record column 3; such as over-head corresponding to the particular period of time, or the particular operation or job, or corresponding to each piece of work completed.

Referring to the "factor" chart or table 10, shown in the drawings, I have omitted part thereof, along the breaks indicated by the dotted lines 11, 12 and 13, and have merely shown the two outer vertical columns 14 and 15, and 16 and 17 respectively; the numbers in columns 14 and 16 designating the "piece rate" quotients and the columns 15 and 17, being the time graduations corresponding to the time graduations on the time or clock card. Since, in the particular illustration of my invention, I am demonstrating my method, in the calculation of the wages or labor cost, the intermediate vertical columns 18, 19 and 20 on one side, and 21, 22 and 23 on the other, contain the precalculated "factors" at the various fixed hourly rates of wages, that is at 30¢, 40¢, and 60¢ per hour; corresponding to elapsed periods of time beginning with the zero row 24, at the bottom and continuing on upwards in periods of tenths of an hour, from half past seven, or 7.5, designating the usual starting time; and starting in the same horizontal row with a zero "quotient", and increasing upwards in tenths, for each tenth of an hour, since such quotient is a time

interval representing the "time" as figured by the output at a given production rate.

My novel method of calculation is carried out as follows in the calculation of wages or labor cost, as shown in the particular illustration:—The time card is first punched, by means of any suitable recording clock, in a space 25, at the top of the time columns 3, provided for the purpose of recording initial starting time at the beginning of any day. In the figure of the drawing, this time is recorded as 7.4 in the morning, of the 15th day of the particular month, the month not being recorded. With that notation the foreman, or other person in charge of the distribution of work, marks down in the column 5, under the heading of "operation number", a serial number or other means of identification, of the particular operation, and also notes in the adjacent columns 6 and 7 respectively, the number of pieces assigned to the "job", and the fixed rate of production on the "job", there being such a production rate predetermined for every operation in the course of manufacture of any article. With the initial starting time punched, the worker proceeds with the task, and after completing the particular job, again punches the clock, now in the same row with the data on the job just completed, with time punching in the particular case illustrated, is 8.8. The finishing time on the particular job, if it is not the end of the working day, and if it is succeeded by some other job, is then taken as the starting time for such next succeeding job; and as the worker again completes the particular task, he again punches the clock. Here the second job was completed at 5 o'clock or the end of the day. The data thus recorded as the work progresses, is the starting and finishing time of each job, the operation or identification number of the job, the number of pieces completed and the number designating the predetermined production rate for the particular operation. The same card may be used for any number of days, that is, it may be of any length, the illustration merely representing a convenient and practical size card, having twelve (12) horizontal rows.

The following working day the same notations of data are repeated, the initial time record of the day being punched on the next clear horizontal line or row, opposite which there may be punched, for the purpose of accuracy and for the prevention of errors, a stamp of some sort, indicating that this time record is the initial record for the day and that no "job" data is to be noted in the same horizontal row therewith. Thus I have shown a form of stamp 26 as used by me in practice, reading: "Start-next-punch-on-new-day". After the initial time record punched in column 3, the same nota-

tions are made for each job, opposite which notations of data, the finishing time is punched. Thus it will be seen that on the next working day, there are four jobs recorded. The first 3 jobs as will be seen from the data recorded are regular piece work jobs, while the last job is a special job not based on any production rate in which the straight hourly wage rate is applied.

In the figure of the drawing I have merely illustrated a "factor" chart and a time card super-imposed thereon between the two sides of the tabulation. To make any calculation it is only necessary to move and position the card with respect to the chart so that the finishing time of the job, on the time scale 2 of the card, is brought into horizontal alignment with the zero or starting time on the chart, which in the particular illustration is 7.5 or half past seven in the morning, and reading off or noting the "factor" in the proper hourly rate column, in alignment with the starting time of the same, on said scale 2. With this notation in the upper left hand corner of the space in column 8; the factor corresponding to the quotient of the number of pieces divided by the rate, is next noted and marked, in the lower right hand corner in the same space, as shown in the figure.

If the factor corresponding to the actual time consumed on the job, as taken from the time scale, is smaller than the factor corresponding to the figured or calculated time, or the "quotient" then the task has been completed in less time than required by the production rate, and a bonus accrues to the workman; the total wage or labor cost being, the sum of these two factors.

If however the last factor, corresponding to the quotient, and noted in the lower right hand corner of the spaces in the column 8, is smaller than the factor corresponding to the actual time consumed on the job, then as will be readily seen, the workman did not come up to the required predetermined production rate, and since the sum of the two factors in that case would give a figure below the flat hourly wage rate, and since the hourly wage rate is guaranteed, the upper factor, namely the factor corresponding to the actual time consumed, is doubled, thus giving the guaranteed flat hourly rate. This is based on the assumption, that the factors are figured on a 50% bonus rate, or representing one half of the hourly wage, as is the case in the particular illustration herein described.

It will thus be apparent that the relation of the two figures noted in column 8, for each job, tells at a glance whether there has been a gain or loss to the management, on the particular labor cost, since the difference between the two factors represents the

actual bonus paid if the lower number is larger than the upper number, while if the lower number is smaller, then the difference represents a loss. The relation of these two numbers or factors, also shows at a glance, whether a man has fallen below the required production rate. In case of straight piece work, that is to say, in case the factors in the chart are made to represent a full 100% of the hourly wage rate, then it places the piece work on a time basis, and in such a case as well, the two factors noted in the column 8, serve to check up on the production.

My novel invention is not limited moreover, to the particular arrangement shown in the figure of the drawing, since the chart and the corresponding time scale may be marked off on portions of an arc of a circle.

It will further be noted that by my novel method and chart, any "off" time, such as lunch time or the like, is automatically taken care of in the calculations by omitting from the time scale on the chart in columns 15 and 16, the particular horizontal rows corresponding to an "off" period. In the particular case illustrated the lunch hour covers a period of seven-tenths ($\frac{7}{10}$) of an hour namely from 12.00 to 12.7 inclusive. Thus it will be seen upon reference to lines 27 and 28 in column 15 of the chart that after 12.00, that is twelve o'clock noon, the first time notation is 12.8, thus automatically omitting from the calculations a period during which no work was performed, although that period may fall within the starting and finishing time of a particular job.

While in the chart shown in the accompanying drawing the factors are based on a 50% bonus scheme, yet if it is desired to calculate the wages in the particular instance on a 100% bonus scheme, that is, to put piece work on a time basis, it is only necessary to add to the sum of the two factors obtained from the chart in normal calculation, the difference between the two factors, thus giving a final sum which is the total wage based on a 100% bonus. The reason for this is readily seen since, for as brought out hereinbefore, the difference between the two factors in any calculation, if the upper factor is smaller than the lower one, is the actual bonus paid. By taking this difference and adding it to the sum of the two factors, a 100% bonus is added, thus making it possible to figure, if necessary, 100% bonus on a 50% bonus chart; although if desired a similar chart can be made up on a 100% bonus scheme.

It will now be apparent that I have devised a novel and useful method and means of computation which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the pres-

ent instance, shown and described a preferred embodiment thereof which will give in practice satisfactory and reliable results, it is to be understood that such embodiment is susceptible of modifications in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent is:

1. In a device of the character stated, a table comprising a time scale, a time interval column substantially parallel to said time scale having therein numbers representing the time increments corresponding to and in operative alinement with the respective graduations on the time scale, and a factor column also extending substantially parallel to said time scale and time increment column containing progressive series of numbers representing the precalculated cumulative cost factors corresponding to and in operative alinement with the respective graduations on said time scale, as well as the respective time increments in said time increment column.

2. In a device of the character stated, a table comprising a time scale, a time increment column extending substantially parallel to said time scale, said column containing numbers representing the time increments corresponding to and in operative alinement with the respective graduations on the time scale, and a series of factor columns containing progressive series of numbers representing the precalculated cumulative cost factors corresponding to and in operative alinement with the respective graduations on said time scale, as well as the respective time increments in said time increment column; each of said series of columns containing the cost factors corresponding to a different particular time interval rate.

3. In a device of the character stated, a table comprising a time scale, a time interval column substantially parallel to said time scale having therein numbers representing the time increments corresponding to and in operative alinement with the respective graduations on the time scale, and a factor column also extending substantially parallel to said time scale and time increment column containing progressive series of numbers representing the precalculated cumulative cost factors corresponding to and in operative alinement with the respective graduations on said time scale, as well as the respective time increments in said time increment column; there being omitted from said time scale, as well as from said time increment column, and said factor column, a suitable portion corresponding to any recess period occurring

during the total period over which said time scale and hence said time increment and said factor columns extend, during which the work ceases, thereby automatically to eliminate from the calculations any such recess period.

4. In a device of the character stated, a table comprising a time scale, a time interval column substantially parallel to said time scale having therein numbers representing the time increments corresponding to and in operative alinement with the respective graduations on the time scale, and a series of factor columns also extending substantially parallel to said time scale and time increment column containing progressive series of numbers representing the precalculated cumulative cost factors corresponding to and in operative alinement with the respective graduations on said time scale, as well as the respective time increments in said time increment column; there being omitted from said time scale, as well as from said time increment column, and said factor columns, a suitable portion corresponding to any recess period occurring during the total period over which said time scale and hence, said time increment and said factor columns extend, during which the work ceases, thereby automatically eliminating from the calculations any such recess period.

5. In a device of the character stated, a table comprising a time scale, a time interval column substantially parallel to said time scale having therein numbers representing time increments or "piece:rate" quotients corresponding to and in operative alinement with the respective graduations on the time scale, and a wage column also extending substantially parallel to said time scale and said "piece:rate" quotient column, containing progressive series of numbers representing the precalculated cumulative partial wage factors corresponding to and in operative alinement with the respective graduations on said time scale as well as the respective time increments in said "piece:rate" quotient column.

6. In a device of the character stated, a table comprising a time scale, a time increment or "piece:rate" quotient column extending substantially parallel to said time scale, containing numbers representing the "piece:rate" quotients corresponding to and in operative alinement with the respective graduations on said time scale, and a series of wage columns also extending substantially parallel to said time scale and time increment column, containing progressive series of numbers representing the precalculated cumulative partial wage factors corresponding to and in operative alinement with the respective "piece:rate" quotients in said time increment column;

each of said series of wage columns containing the partial wage factors corresponding to a different particular wage rate.

7. In a device of the character stated, a table comprising a time scale, a time interval column substantially parallel to said time scale having therein numbers representing the "piece:rate" quotients or time increments corresponding to and in operative alignment with the respective graduations on said time scale, and a wage column also extending substantially parallel to said time scale and said time increment column, containing progressive series of numbers representing the precalculated cumulative partial wage factors corre-

sponding to and in operative alinement with the respective graduations on said time scale as well as the respective "piece:rate" quotients in said time increment column; there being omitted from said wage column as well as from said time scale a time increment column, a suitable portion corresponding to any recess period occurring during the total period over which said time increment and said wage columns extend, during which both work and wages cease, thereby automatically to eliminate from the calculations any such recess period.

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