

July 6, 1954

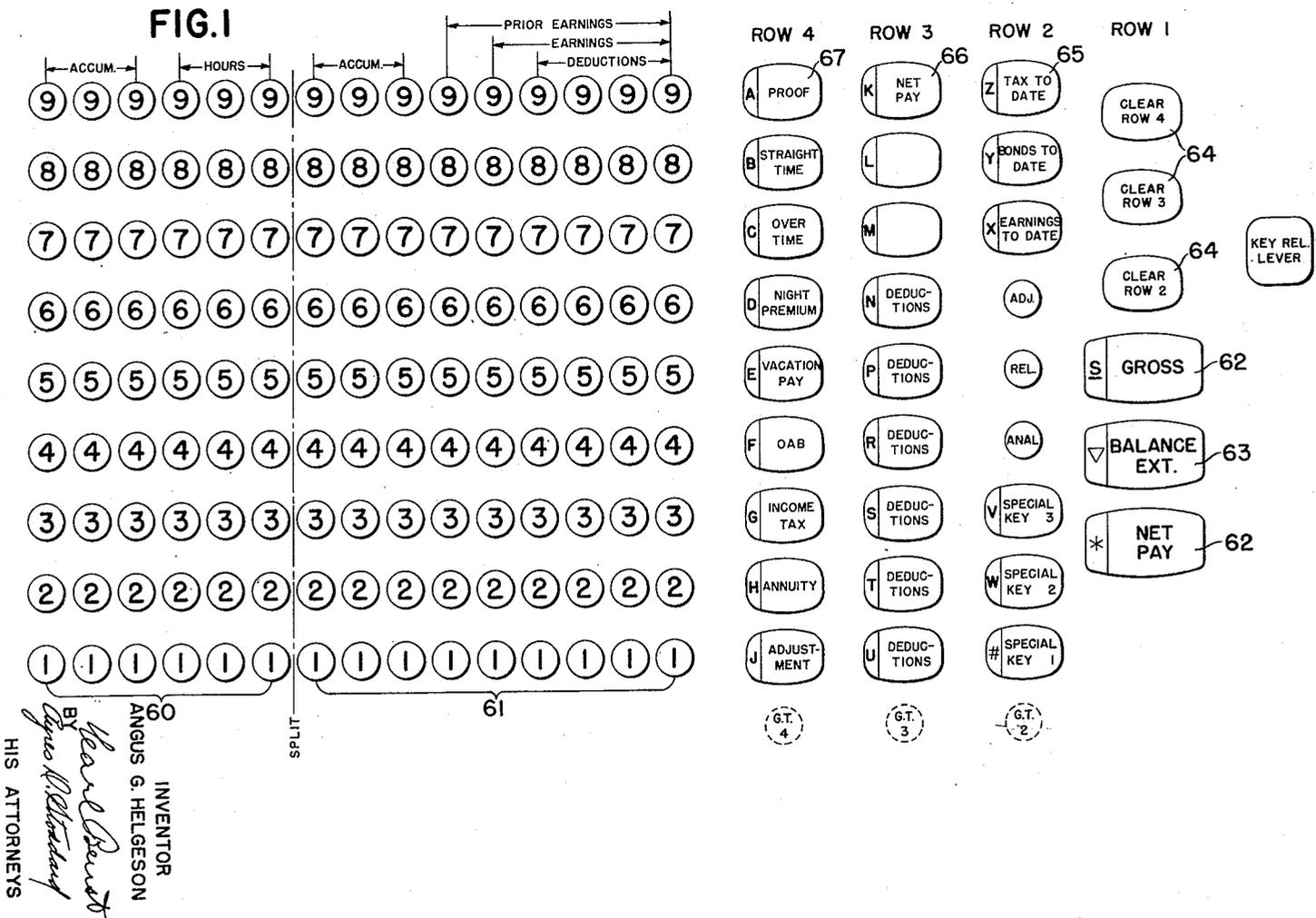
A. G. HELGESON

2,682,993

Filed Nov. 21, 1950

ACCOUNTING MACHINE DATA INDICATOR

11 Sheets-Sheet 1



July 6, 1954

A. G. HELGESON

2,682,993

ACCOUNTING MACHINE DATA INDICATOR

Filed Nov. 21, 1950

11 Sheets-Sheet 2

171

FIG. 2

HOURS	BASE PAY	OVERTIME PAY	AOB	WITHHOLDING TAX	NET PAY					
					NO OTHER DEDUCTIONS	UNION DUES	INSURANCE	HOSPITAL		
	JOHN C. DOE		236	\$1.29 1/2						
2	2.59		.03		2.56	1.06	.46	.46		
4	5.18		.05		5.13	3.63	3.03	3.03		
6	7.77		.08		7.69	6.19	5.59	5.59		
8	10.36		.10		10.26	8.76	8.16	8.16		
10	12.95		.13		12.82	11.32	10.72	10.72		
12	15.54		.16		15.38	13.88	13.28	13.28		
14	18.13		.18		17.95	16.45	15.85	15.85		
16	20.72		.21		20.51	19.01	18.41	18.41		
18	23.31		.23		23.08	21.58	20.98	20.98		
20	25.90		.26		25.64	24.14	23.54	23.54		
22	28.49		.28	.40	27.81	26.31	25.71	25.71		
24	31.08		.31	.90	29.87	28.37	27.77	27.77		
26	33.67		.34	1.20	32.13	30.63	30.03	30.03		
28	36.26		.36	1.60	34.30	32.80	32.20	32.20		
30	38.85		.39	1.90	36.56	35.06	34.46	34.46		
32	41.44		.41	2.40	38.63	37.13	36.53	36.53		
34	44.03		.44	2.80	40.79	39.29	38.69	38.69		
36	46.62		.47	3.10	43.05	41.55	40.95	40.95		
38	49.21		.49	3.60	45.12	43.62	43.02	43.02		
40	51.80		.52	3.90	47.38	45.88	45.28	45.28		
42	54.39	1.30	.56	4.50	50.63	49.13	48.53	48.53		
44	56.98	2.59	.60	5.10	53.87	52.37	51.77	51.77		
46	59.57	3.89	.63	5.60	57.23	55.73	55.13	55.13		
48	62.16	5.18	.67	6.20	60.47	58.97	58.37	58.37		
39.9	51.77		.52	3.90	47.35	45.85	45.25	45.25		
39.8	51.54		.52	3.90	47.12	45.62	45.02	45.02		
39.7	51.41		.51	3.90	47.00	45.50	44.90	44.90		
39.6	51.28		.51	3.90	46.87	45.37	44.77	44.77		
39.5	51.15		.51	3.90	46.74	45.24	44.64	44.64		
					.00	1.50	2.10	6.25		
.00	.13	.26	.39	.52	.65	.78	.91	1.04	1.17	FRACTIONAL EARNINGS
.00	.13	.26	.39	.41	.54	.67	.80	.93	1.06	BALANCE FACTOR
1.30	1.43	1.56	1.69	1.82	1.95	2.08	2.21	2.34	2.47	EARNINGS
1.19	1.32	1.34	1.47	1.60	1.73	1.86	1.99	2.12	2.25	BALANCE FACTOR
1.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	HOURS

INVENTOR
ANGUS G. HELGESON

BY *Charles Beust*
James R. Stoddard
HIS ATTORNEYS

July 6, 1954

A. G. HELGESON

2,682,993

ACCOUNTING MACHINE DATA INDICATOR

Filed Nov. 21, 1950

11 Sheets-Sheet 3

FIG. 3

172

HOURS	BASE PAY	OVERTIME PAY	A.O.B.	WITHHOLDING TAX	NET PAY			
					NO OTHER DEDUCTIONS	UNION DUES	INSURANCE	HOSPITAL
40	51.80		.52	3.90	47.38	45.88	45.28	41.13
20	25.90		.26		25.64	24.14	23.54	19.39
39-3/4	51.48		.51	3.90	47.07	45.57	44.97	40.82
39-1/2	51.15		.51	3.90	46.74	45.24	44.64	40.49
39-1/4	50.83		.51	3.70	46.62	45.12	44.52	40.37
48	62.16	5.18	.67	6.20	60.47	58.97	58.37	54.22
28	36.26		.36	1.60	34.30	32.80	32.20	28.05
47-3/4	61.84	5.02	.67	6.20	59.99	58.49	57.89	53.74
47-1/2	61.51	4.86	.66	6.20	59.51	58.01	57.41	53.26
47-1/4	61.19	4.69	.66	5.90	59.32	57.82	57.22	53.07
36	46.62		.47	3.10	43.05	41.55	40.95	36.80
16	20.72		.21		20.51	19.01	18.41	14.26
15-3/4	20.40		.20		20.20	18.70	18.10	13.95
15-1/2	20.07		.20		19.87	18.37	17.77	13.62
15-1/4	19.75		.20		19.55	18.05	17.45	13.30
44	56.98	2.59	.60	5.10	53.87	52.37	51.77	47.62
24	31.10		.31	.90	29.87	28.37	27.77	23.62
23-3/4	30.76		.31	.70	29.75	28.25	27.65	23.50
23-1/2	30.43		.30	.70	29.43	27.93	27.33	23.18
23-1/4	30.11		.30	.70	29.11	27.61	27.01	22.86
32	41.44		.41	2.40	38.63	37.13	36.53	32.38
12	15.54		.16		15.38	13.88	13.28	9.13
31-3/4	41.12		.41	2.40	38.31	36.81	36.21	32.06
31-1/2	40.79		.41	2.20	38.18	36.68	36.08	31.93
31-1/4	40.47		.40	2.20	37.87	36.37	35.77	31.62
8	10.36		.10		10.26	8.76	8.16	4.01
4	5.18		.05		5.13	3.63	3.03	3.03
JOHN C. DOE				236	\$1.29½			

INVENTOR
ANGUS G. HELGESON

Kearl Beust
BY
Byron R. Stoddard
HIS ATTORNEYS

July 6, 1954

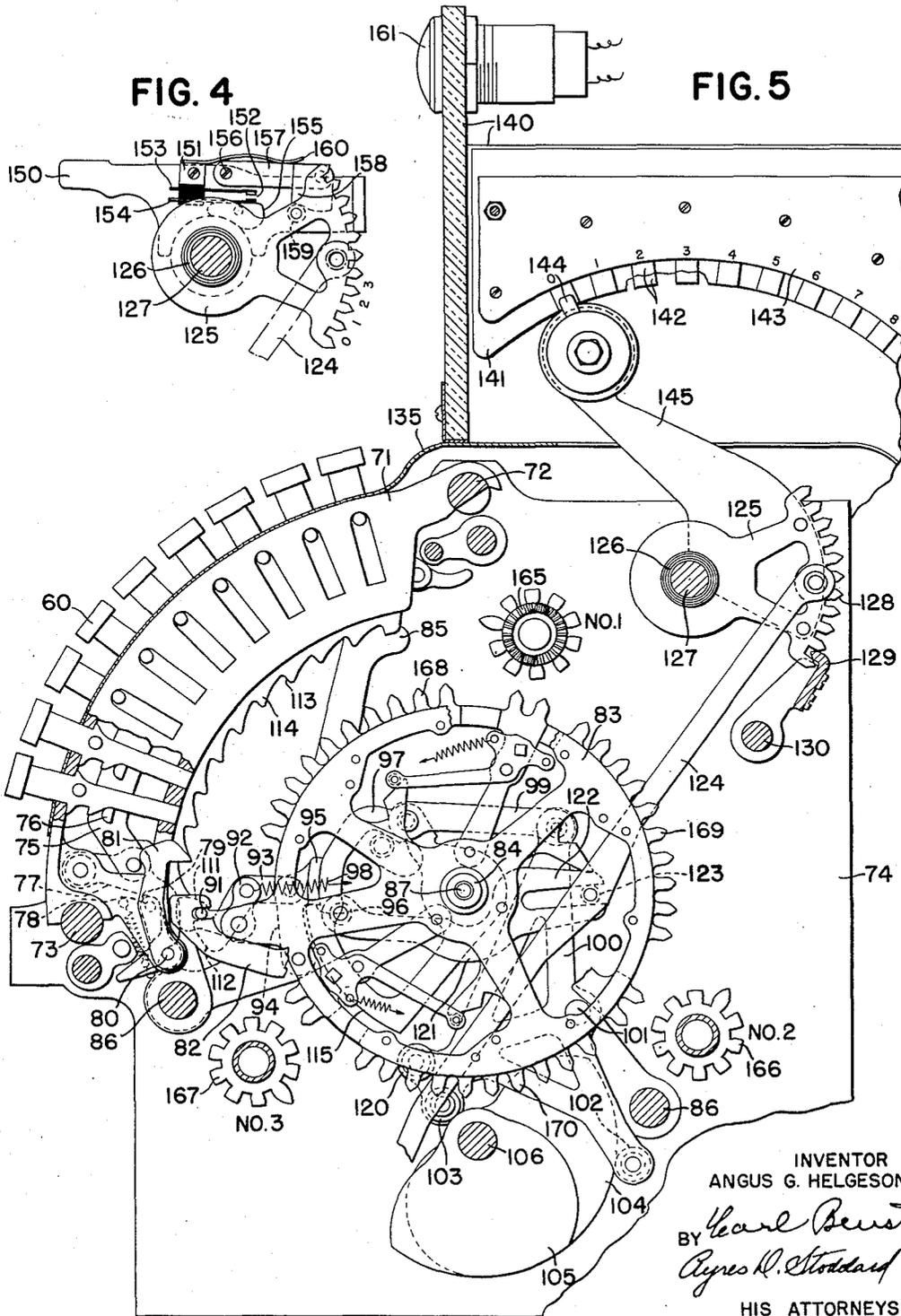
A. G. HELGESON

2,682,993

ACCOUNTING MACHINE DATA INDICATOR

Filed Nov. 21, 1950

11 Sheets-Sheet 4



July 6, 1954

A. G. HELGESON

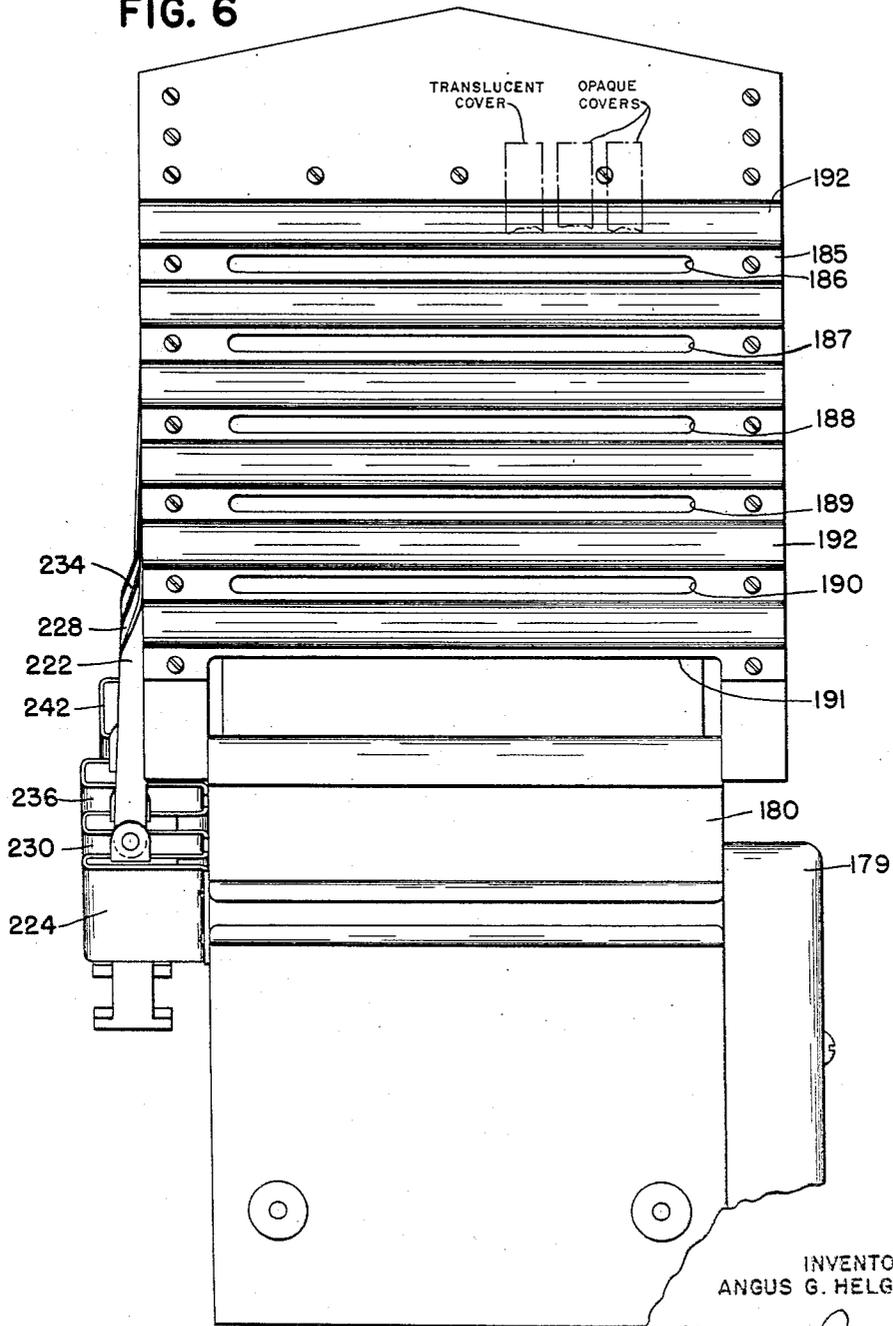
2,682,993

ACCOUNTING MACHINE DATA INDICATOR

Filed Nov. 21, 1950

11 Sheets-Sheet 5

FIG. 6



INVENTOR
ANGUS G. HELGESON

BY *Harold Bernt*
Agnes H. Stoddard

HIS ATTORNEYS

July 6, 1954

A. G. HELGESON

2,682,993

ACCOUNTING MACHINE DATA INDICATOR

Filed Nov. 21, 1950

11 Sheets-Sheet 6

FIG. 7

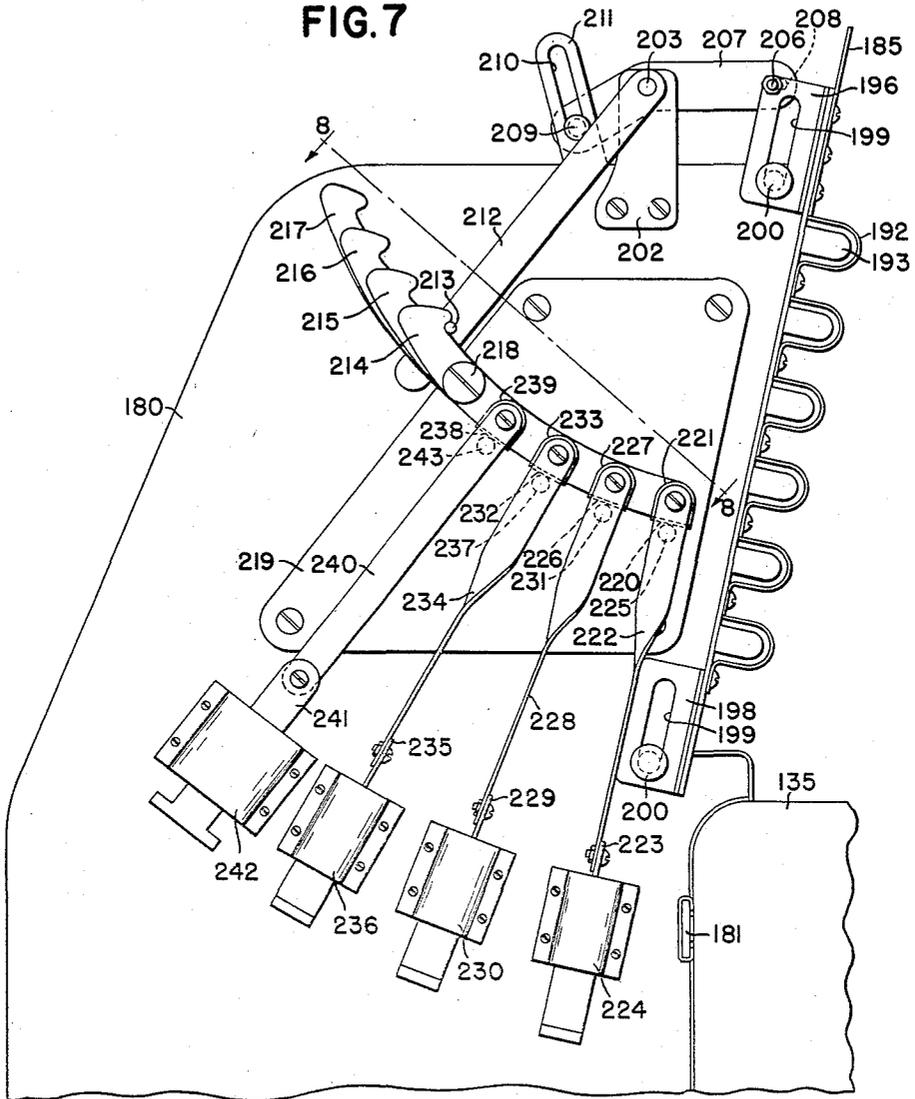
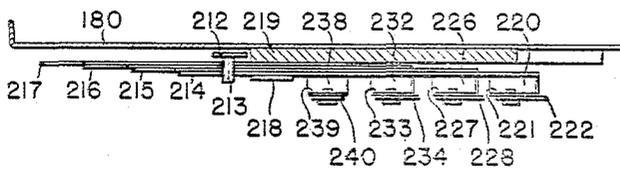


FIG. 8



INVENTOR
ANGUS G. HELGESON

BY *Carl Benst*
Agnes H. Stoddard
HIS ATTORNEYS

July 6, 1954

A. G. HELGESON

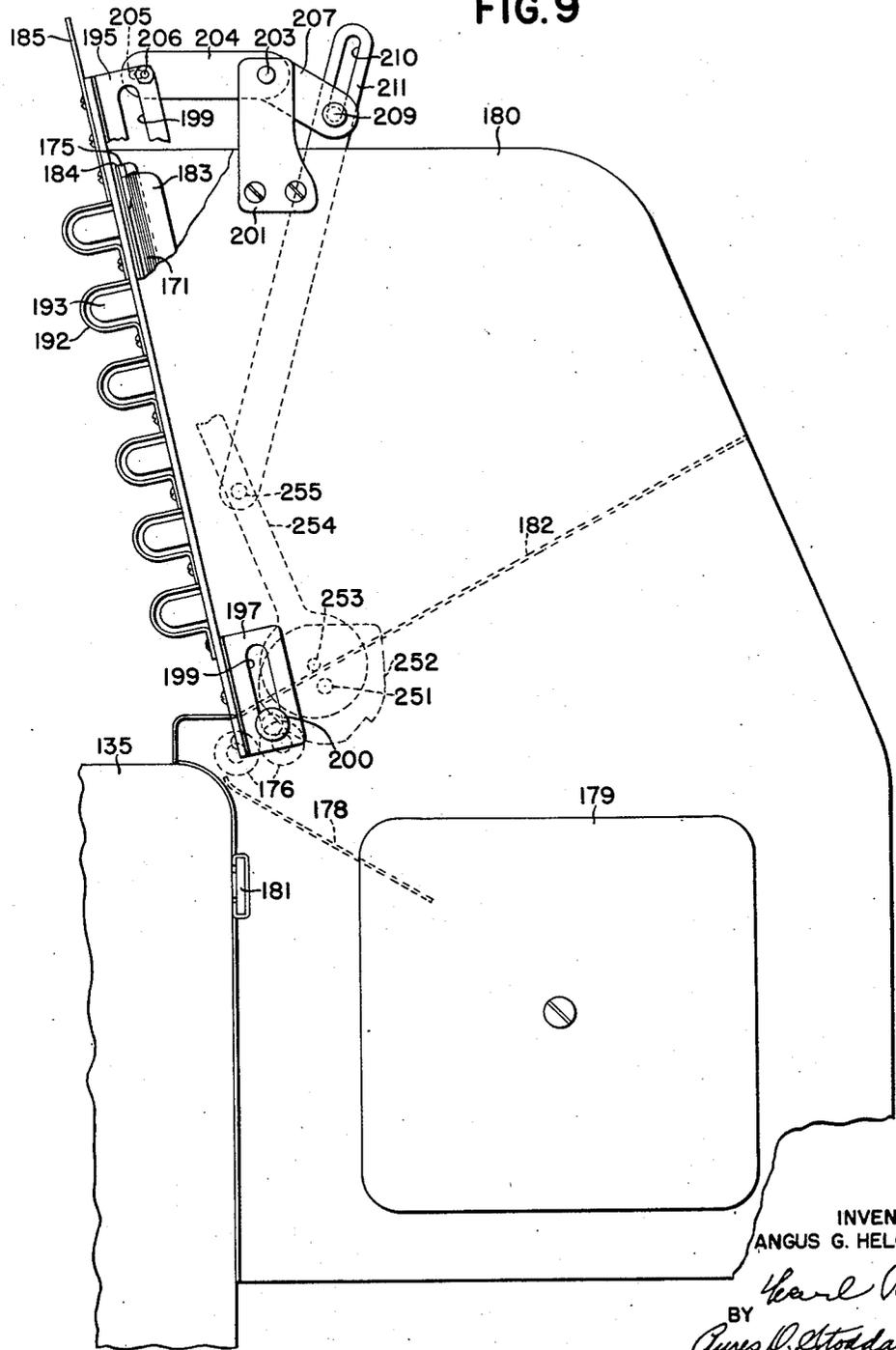
2,682,993

ACCOUNTING MACHINE DATA INDICATOR

Filed Nov. 21, 1950

11 Sheets-Sheet 7

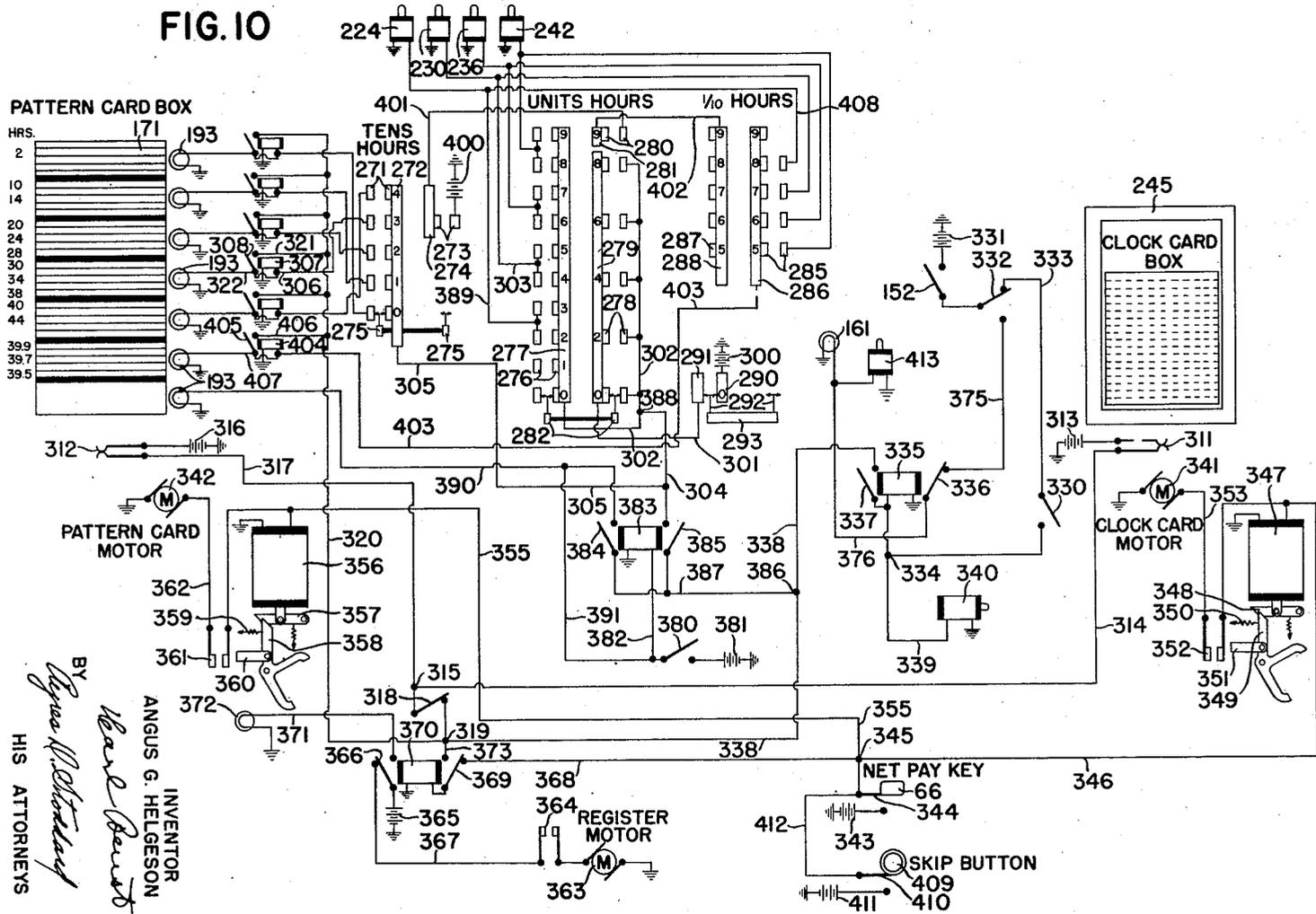
FIG. 9



INVENTOR
ANGUS G. HELGESON

BY *Harold Benoit*
Agnes R. Stoddard
HIS ATTORNEYS

FIG. 10



BY
Angus G. Helgeson
 ANGUS G. HELGESON
 INVENTOR
Walter R. Smith
 HIS ATTORNEYS

Filed Nov. 21, 1950

ACCOUNTING MACHINE DATA INDICATOR

11 Sheets-Sheet 8

July 6, 1954

A. G. HELGESON

2,682,993

July 6, 1954

A. G. HELGESON

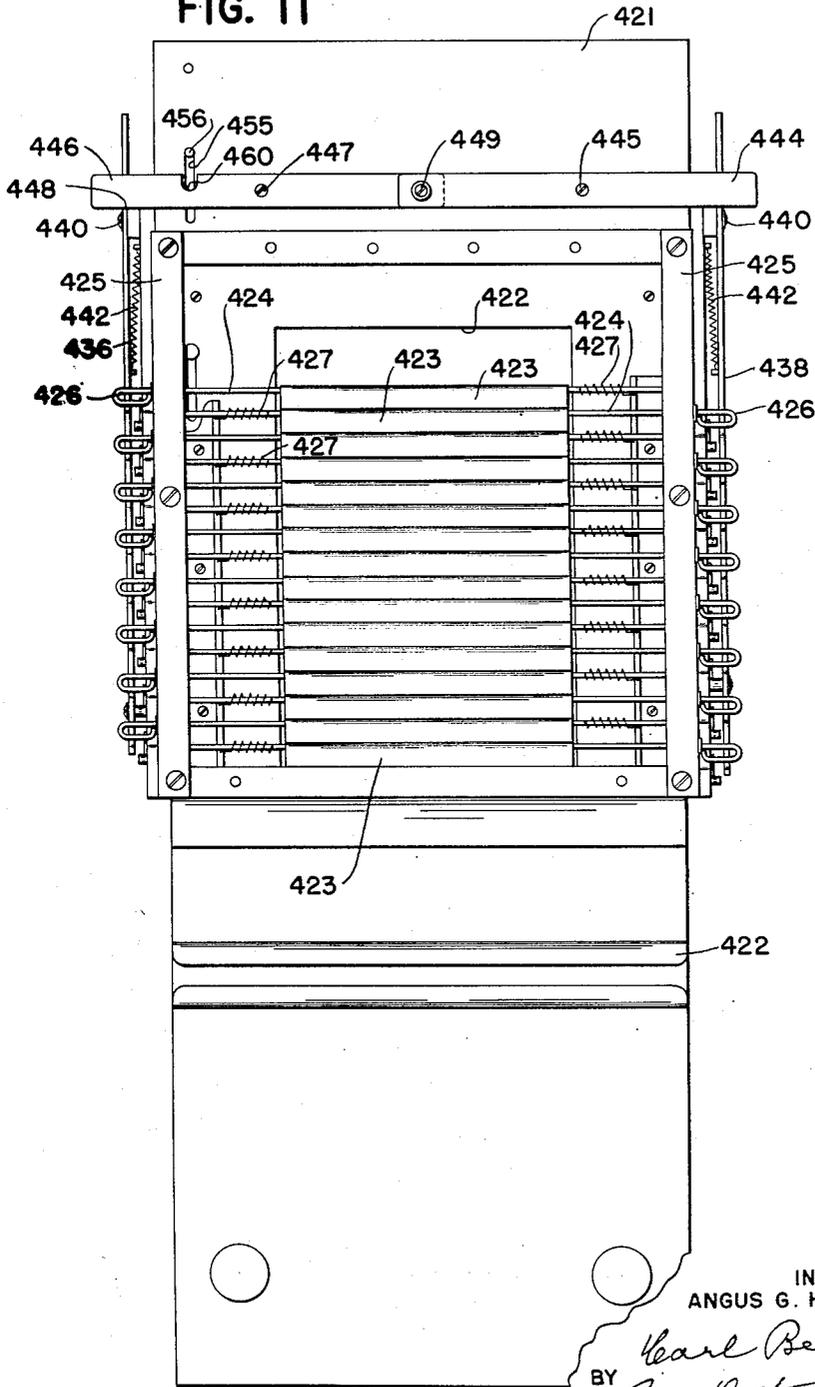
2,682,993

ACCOUNTING MACHINE DATA INDICATOR

Filed Nov. 21, 1950

11 Sheets-Sheet 9

FIG. II



INVENTOR
ANGUS G. HELGESON

BY *Karl Beust*
Ayres P. Stoddard
HIS ATTORNEYS

July 6, 1954

A. G. HELGESON

2,682,993

ACCOUNTING MACHINE DATA INDICATOR

Filed Nov. 21, 1950

11 Sheets-Sheet 10

FIG. 12

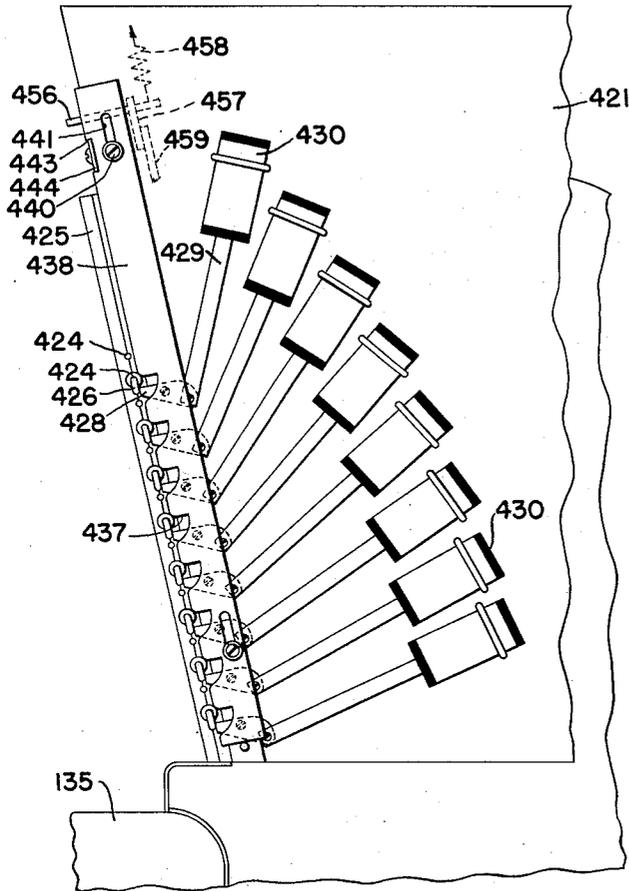
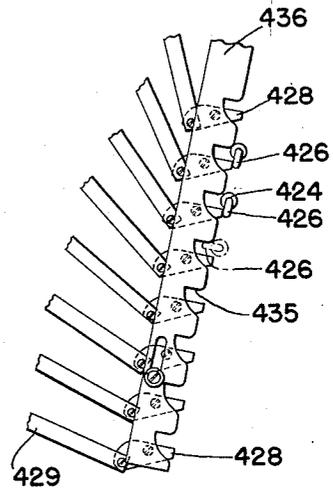


FIG. 13



INVENTOR
ANGUS G. HELGESON

Carl Beust
BY
Raymond H. Stoddard
HIS ATTORNEYS

UNITED STATES PATENT OFFICE

2,682,993

ACCOUNTING MACHINE DATA INDICATOR

Angus G. Helgeson, Birmingham, Mich., assignor
to The National Cash Register Company, Day-
ton, Ohio, a corporation of Maryland

Application November 21, 1950, Serial No. 196,906

13 Claims. (Cl. 235—23)

1

This invention relates to accounting machines and similar business machines and is directed particularly to means for speeding up the recording of payroll data and the consequent printing of the payroll checks, and to control various mechanisms in the machine in this connection.

This invention is especially adapted to be used in machines of the payroll type, shown and described in the United States Patent No. 2,467,704, issued April 19, 1949, to Pascal Spurlino, Rudolph J. Moser, Alfred G. Kibler, Marvin D. Frost, and Walter J. Kreider, and for illustrative purposes is embodied in a machine of the type shown in said patent.

This invention is also embodied in machines of the general type shown in the following United States Letters Patent and reference may be had to them and to the above-mentioned patent for a complete showing and description of standard mechanism not fully disclosed herein: United States Patents Nos. 1,619,796; 1,747,397; 1,761,542; and 1,916,535, issued March 1, 1927; February 13, 1930; June 3, 1930; and July 4, 1933, respectively, to Bernis M. Shipley; No. 2,175,346, issued October 10, 1939, to Maximilian M. Goldberg; No. 2,141,332, issued December 27, 1938, to Charles H. Arnold; No. 1,693,279, issued November 27, 1928, to Walter J. Kreider; No. 2,305,000, issued December 15, 1942, to Mayo A. Goodbar; No. 2,361,662, issued October 31, 1944, to Pascal Spurlino and Konrad Rauch; No. 2,345,839, issued April 4, 1944, to Pascal Spurlino, Mayo A. Goodbar, and Marvin D. Frost; and No. 2,351,541, issued June 13, 1944, to Everett H. Placke.

The specific machine shown in the above-mentioned Patent No. 2,467,704, embodying the present invention, and as now constructed, is well adapted for use by any organization where a large number of payroll checks are to be issued periodically and particularly where such organizations wish to keep accurate records of totals of amounts paid to their employees, and also a record of various deductions which nowadays are common practice. As is well known, such deductions include social security payments, group insurance payments, income tax withholdings and union dues, and many other types of deductions, which various organizations permit their employes to make against gross earnings for a definite period.

Accurate records of each of the various types of individual deductions are accumulated in the machine, with the result that the company may at any time definitely ascertain, by means of printed records, the various totals of such deductions, and also the totals of the net earnings

2

of the employees, the gross earnings of the employees, and other records relative to the employees.

Other records, such as the total number of regular hours worked and the total number of overtime hours worked, are also accumulated in the machine, so that the company may at any time definitely ascertain by means of printed records the number of regular hours paid for and also the number of overtime hours paid for.

The machine is also adapted to print a payroll check, upon the main portion of which are shown the consecutive number, the date, and the net amount of the check printed in two places; and on the stub portion of the check, which is to be torn off and retained by the employee before he cashes the check, are shown the number of regular hours he worked, the gross earnings for those regular hours, the number of overtime hours, the gross earnings for the overtime hours, a total of the gross regular-hour and overtime-hour earnings, a list of all deductions, showing the amount of each, a symbol for each deduction, and the net pay. The net pay printed on the stub portion of the check is identical with the net amount which is printed in two places on the main portion of the check.

The machine in which the present invention is embodied is also adapted to print upon the payroll summary sheet, which, for example, may be used for the departmental summary of the employees in any one or more departments. If the departments are too large, the payroll summary may be allotted to various jobs of the departments.

An individual employee's earnings record card may also be printed by the machine in which this present invention is embodied. Upon this earnings card, which is divided into columns, there may be printed the number of regular hours the employee works and the number of overtime hours he works; also the gross amount of earnings for regular hours and the gross amount of earnings for overtime hours may be recorded. The deductions against each employee are also printed and recorded on this particular earnings card record for the individual employee. In the last column on the card there is a space for a balance forward, which is picked up from a former earnings record, set up on the keyboard, and printed in this column, when a new card is begun for the employee when his old card is filled.

On the top of the machine there is provided a time card box, which carries the time cards for

3

each individual employee. On these time cards there is various data relating particularly to the number of regular hours and the number of overtime hours which the employee has worked. On this card there are also various types of deductions which have been previously mentioned and which are recorded thereon by the clerk.

These time cards are adapted to be ejected from the stack upon operation of the Net Pay key.

Mounted on top of the machine and alongside the time card box is also what will be referred to hereinafter as a pattern card box. This pattern card, there being one for each individual employee, has printed on it certain constant figures which relate to the printing of the payroll check for this particular employee. This employee's time clock card and his pattern card are side by side, one in the time card box and one in the pattern card box, and other employees' time cards and pattern cards are stacked successively, so that, each time a time clock card is ejected, the corresponding pattern card for the same employee will be ejected.

This pattern card on the left shows the number of hours worked, in the next column the base pay for that number of hours, which base pay has been figured according to the rate which the employee gets per hour. Near the bottom of the card the employee's name and check number are shown and, in addition, his hourly rate, which in the example and illustration given herein is \$1.29½ per hour. The same employee's name is on his time clock card. In the third column from the left there are figures which show the overtime pay. The next column shows the OAB deductions at the rate of 1%. The next column shows the withholding tax to be deducted.

The next four columns show various net pays for this particular individual, according to the number of hours he has worked and according to the deductions which he has against his pay for that week. The left-hand Net Pay column shows the net pay with no other deductions outside of the OAB and the withholding tax. The second Net Pay column shows the amount of net pay for the employee when union dues have been deducted in addition to the income tax and OAB. The third Net Pay column, which is the second from the right, shows the net pay to which the employee is entitled after his insurance premium has been taken out, along with his withholding tax and OAB, and the right-hand Net Pay column shows what his net pay will be when his hospitalization is taken out along with his withholding tax and OAB.

As above mentioned, this pattern card is ejected upon the depression of the Net Pay key, which causes the employee's net pay to be printed on the check which has been inserted in the machine.

This pattern card is divided into groups of hours, and the front of the pattern card box is so arranged that only the proper line which is to be used by the operator in computing the employee's pay is to be read. This is to be accomplished by lighting a lamp, the selection of which is controlled by the number of hours the employee has worked, and which is under the control of the keys on the machine in the hourly banks.

The card box is provided with a movable face, which has windows, so that one line of each group of lines is visible. The movable face is adapted to be shifted downwardly under control

4

of the differential mechanism of the hourly banks, so that, through the combination of the moving of the face of the box and the selection of the proper light, any one of the four lines of a group of data may be selected after the particular group has been selected by the depression of the hours keys. This will all be described in detail later on.

Generally, the movable face is constructed in such a manner that, through the use of solenoids, the said movable face can be lowered four additional positions, making five in all, so that, through a combination of the moving of the face of the box and the selection of the proper light to be illuminated, any one of thirty lines can be selected on each card.

Let us take a specific example and describe how the pre-calculated net pays are arrived at.

The first Net Pay column is the pre-calculated net pay that would be paid to an employee if he had no other deductions than OAB tax and withholding tax. The second Net Pay column is the net pay that would be paid to that employee if union dues of \$1.50 were deducted from his pay that week. The third Net Pay column is the amount which would be paid to him if a group insurance premium of \$2.10 were deducted from his pay that week, and the fourth Net Pay column is the amount which would be paid to him if group hospitalization were deducted that week, amounting to \$6.25.

Only one of these columns should be clearly visible on each pay. On the week that union dues are being deducted, the Union Dues Net Pay column should be completely visible, and, on the week that insurance is being deducted, the Insurance column should be completely visible. On the week that there are no fixed deductions, the first Net Pay column should be clearly visible, and, on the week that group hospitalization is being deducted that Net Pay column should be clearly visible. In each case, the other three columns should be and are at least partially concealed.

However, on the weeks that the union dues or insurance are being deducted, perhaps the employee does not belong to the union or does not participate in the insurance, and in these cases his pattern card would have the net pay calculations in either one of these columns marked out. Therefore, when such a card appears in the pattern box, no deduction would be made for union dues or insurance, and it is then possible to record the \$47.38 in the first column, even though the amount is partially concealed.

In order to make this partial concealment, a Plexiglas flexible slide is inserted at the beginning of the particular week, which Plexiglas may be a red translucent slide. Also two opaque slides to the right should be used when no fixed deductions are taken; the red translucent slide would cover the union dues column, and the two opaque slides would cover the insurance and hospitalization columns.

When union dues are being deducted, the red translucent slide would cover the No Deduction column, and the two opaque slides would cover the Insurance columns. Therefore, if any employee does not belong to the union, it would still be possible to read, as above mentioned, the \$47.38 through the red translucent slide. However, the red translucent slide would prevent the operator from using the \$47.38 by accident when the man did belong to the union. When insurance is being deducted, the red slide should cover

5

the No Deduction column, and one opaque slide should be moved over to cover the Union Dues column, and the other opaque slide to cover the Hospitalization column.

At this point it might be well to describe briefly the sequence of a normal operation of the machine.

First, a group of clock cards for a particular department is inserted in the clock card box, which is located, as above mentioned, on the top of the machine. Then a corresponding number of pattern cards for these same employees is inserted in the pattern card box, which is normally located on top of the machine, just to the left of the clock card box. This pattern card box is provided with the same type of feeler mechanism that the clock card box is provided with, which will assure the operator that a pattern card goes out of the pattern card box every time the clock card mechanism is operated to eject a clock card. If a card does not go down, a light is lighted on the face of the pattern card box, and the current from the machine is shut off. Thus, when the current is off, the operator can tell from whichever light goes on as to which box failed to eject the card. Therefore, by providing, through the light system, that a card goes down in each box each operation, it insures that a proper sequence of cards will be maintained between the two stacks of cards, so that the clock card and the pattern card for the same employee will always be the front card in each of their respective boxes. As above mentioned, the name of the employee and his clock number are on the clock card and are visible to the operator; also the name of the employee is on the pattern card, and also the rate per hour shows on the pattern card.

Having placed the two sets of cards in the two boxes—that is, the clock card box and the pattern card box—the operator first will pick up all of the old balances appearing on the earnings card for this particular employee, which earnings card is taken from the regular payroll file. She will first pick up the balance of the withholding tax and, at the same time she is making these pickups, will insert the check into the check chute, ready to be printed on at the proper time. The last pickup should be the earnings-to-date pickup, and at this time she should record the total hours on the left side of the keyboard. Just before the operation of the machine, she will insert the earnings card in the machine on the printing table, and therefore the total hours will be printed on the earnings card and on the check in this operation.

At the same time, the regular differential mechanism in the machine for the three banks of hour keys will control three wipe switches and move them into position, which will set up the right type of an electrical circuit to cause the proper line to be selected on the pattern box, moving the face of the box to the right position, and illuminate the proper light in order that the correct line is selected. The total hours are accumulated on this operation, together with a total of the earnings-to-date, in their respective totalizers.

The total number of hours accumulated in the machine for each payroll division is later checked against a prelisted accumulation of hours from the clock cards in order to prove that the right hour keys were selected, and, therefore, proving that the correct line was selected on the

6

pattern box. Thus, as a result of the movement of the light switches, under control of the hours keys, which was brought about by the setting of the proper hours on those hours keys, the pattern box mechanism selects and illuminates the proper line on the face of the card, according to the hours recorded.

Reading from that illuminated line on the pattern card, the operator will then record the total amount of the base pay and the total overtime hours and earnings (if there are any), the total amount of the OAB tax, the withholding tax, and whatever fixed deduction is being deducted that week, provided this employee has such a deduction to be made. The net amount, depending upon the fixed deduction applicable to this employee, appears in one of the Net Pay columns and should be visible at all times. The operator then records whichever net pay is visible, either the one for the fixed deduction factor being deducted that week or one without any fixed deduction, depending on whether or not that type of deduction is applicable to that particular employee whose check is being written.

The "K" key, which is used to record the amount of the net pay in this case, causes such amount to be recorded to be deducted from the crossfooter and causes that amount to be printed on the main portion and on the stub of the check as well as on the journal sheet, thus completing the check and ejecting the same, as well as actuating both the clock card box and the pattern card box, causing the clock card and the pattern card to be ejected, so as to bring to view the clock card and the pattern card for the next employee whose check is to be written.

The routine of the sequence of operations on the payroll machines of the type shown in the above-mentioned Patent No. 2,487,704 calls for the use of the withholding tax pickup key first on every check, and it, therefore, requires the operator to press the key regardless of whether or not there is any withholding tax to pick up. This withholding tax key then serves the purpose of signalling the operator as to whether or not the previous check written was written correctly.

If the operator is able to pick up the amount of the withholding tax with that pickup key, then she knows that the previous check was completed correctly. If the withholding tax key is locked on this operation, that means that there was still some amount remaining in the crossfooter, thus giving evidence of the fact that the previous check was not correctly written.

Should such a thing occur, the operator would then remove the last check from the check compartment underneath the machine, place it in the check chute upside down, and hit the Net Pay key, which would cause the machine to clear the amount of the difference out of the crossfooter and print that amount, which is the net amount of the error, on the back of the check. The operator would then lay aside this check for correction at a later time, and the machine, together with the crossfooter, would be automatically adjusted back to zero; thus the withholding tax key would be unlocked. If any condition should leave the crossfooter at zero and locked up, as a result of being on the subtract side, provision is made to release this lock on the next pickup operation of the withholding tax key.

Thus far the operation has been described in connection with a pattern card, which has 27 patterns of hours, providing for every full day up to six days and every half day within each

one of those six days, and also providing for patterns for five of the days, showing fractional hours by quarters in order to take care of time lates in quarter fractional hours.

There is also shown in connection with this application a pattern card which provides five fixed patterns for 39.9, 39.8, 39.7, 39.6, and 39.5 hours. This chart provides six patterns for every even hour from 0 up to 48 hours. In addition to that, it provides a special pattern chart at the bottom, showing earnings patterns for each .1 hour from 0 up to 2 hours.

In addition to providing the earnings for these various hours, it also provides a chart of proof factors for the same units of hours. It is this additional section of the pattern card, together with the proper set-up on the machine, which makes the additional spread of 500 patterns possible.

The machine is constructed to provide an operating key, special key No. 1, which will cause any amount recorded on the keyboard to accumulate in its own total, and which non-prints all amounts and non-spaces all of the records.

Another special key, named special key No. 2, is a non-operating key, which, when depressed together with any operating key on the machine, allows that operating key to function, as it normally does, but also causes the amount previously accumulated in total key No. 1 to transfer automatically into the accumulator controlled by the operating key and print on all of the records as determined by the operating key.

Such mechanism for controlling the selection and operation of the totals and the transfer of totals is fully illustrated and described in the above-mentioned patents.

Whenever an operator sets up the hours on the left side of the keyboard and the earnings on the right side of the keyboard, and no line is selected or illuminated on the pattern box, she then knows that she does not have that pattern as an active pattern on the card.

Now let us assume, for example, that the number of hours recorded were 34.6 hours. No line will be illuminated, and therefore the operator will press a special key No. 3, which will not retain but will select and illuminate the line for the 34-hour pattern, and it will also illuminate a special light for the lower chart. Thus, there will be two lights illuminated on the pattern box at the same time, the lower light illuminating the special chart at the bottom, and the upper will illuminate the line for the 34 hours worked.

The operator then will set up \$44.03 in the special key No. 1, which amount will be accumulated into that total. She will then read from her special chart at the bottom of the pattern card, which amount appeared in the position for .6 hour, which is the difference between 34 hours and 34.6 hours. This amount is 78 cents, which she will record on the keyboard, then she will press the special key No. 1. The operator then presses special key No. 2 first, and, immediately after, she will press the proper earnings key, which in this case will be the key marked "Straight Time." That would be \$44.81, which is the amount accumulated in the special total No. 2 to print as a regular earnings entry on all records and accumulate in the earnings total and add the earnings to the crossfooter. The operator then records the OAB tax, but she will see from the position of the 78 cents on the chart that she is supposed to add one cent to the OAB tax and ten cents to the withholding tax.

Therefore, when she records the OAB tax, instead of recording 44 cents, she will record 45 cents, and the withholding tax, instead of recording \$2.80, which appears on the line for the 34-hour premium, she will record \$2.90, which is the \$2.80 plus the extra ten cents. The operator will then read the proper net pay figure appearing on the pattern card for 34 hours. In this case it would be \$40.79. She will record that amount on the keyboard and press the special key No. 1, which will accumulate such amount. She will then read from the special chart at the bottom of the pattern card the amount of the balancing factor for the adjustment. In this case that amount is 67 cents. Having recorded this amount also through the special key No. 1, she will press the special key No. 2, followed by the "K" Net Pay key.

This "K" Net Pay key functions as it normally does, causing the amount to be printed on the check for the total amount in the accumulator of special key No. 1. That amount will be transferred into the totalizer associated with the "K" key, subtracted from the crossfooter, and printed on all records, and the amount so printed will be \$41.46.

This again causes the check to be ejected and stacked, and the operator then proceeds to the next check.

During the writing of the above check for 34.6 hours, \$44.03 and 78 cents making a total of \$44.81 were added into the crossfooter. The OAB of 45 cents, the withholding tax of \$2.90, the net pay of \$40.79 for 34 hours and the net pay of 67 cents for .6 hour making a total of \$44.81 were all subtracted from the gross pay of \$44.81, thus leaving the crossfooter at zero which proves that all computations have been made correctly, and therefore, the operator may proceed with the writing of the next check.

If an error had been made during the printing of the above check the machine would have been locked by mechanism, well known in the art, under control of the crossfooter when the latter is not at zero. One form of such mechanism is shown in the Rudolph J. Moser Patent No. 2,417,563.

The machine is also provided with an electrical contact switch, which feels the position of the differential mechanism associated with the thousand-dollar bank of keys. When the thousand-dollar bank is in the zero position, or in the No. 1 or No. 2 position of the bank, the differential will cause the switch to remain open, thus preventing any contact from taking place.

However, when the differential for that bank is in the position to record \$3,000.00 or more, the differential causes the switch to close, thus sending an electrical signal to a red lamp located on the top of the machine, and, when this light is illuminated on the clearing of the earnings to date total, the operator of the machine will know that the particular employee has just completed earnings of \$3,000.00 or more. Thus, she will split the amount of the OAB tax on that particular check. When the operator comes to record the amount of the split OAB tax in a case of this kind, she will look at the dials which show the total and read the amount in excess of \$3,000.00. For example, let us say that we are writing a check, in which the earnings of the employee for this particular week were \$100.00, and the previous earnings to date picked up was \$2,970.00. Therefore, when the new balance of the earnings to date is extended, a red light is illuminated,

and the operator will see by the total indicator dials \$3,070.00, indicating that \$70.00 of the earnings were not taxable for OAB purposes.

The operator, therefore, records 70 cents in special key No. 1 totalizer, which will non-print all of the records and accumulate a total of that 70 cents, and then she will record 30 cents, which was to be collected as a tax, through the regular OAB tax key, in this particular case key No. 22, and marked "F." She will then continue on with the balance of her checks. Let us assume, for example, that there is no withholding tax on this particular check, and normally, if OAB tax were to be deducted, the net check, as indicated by the pattern card, calls for \$99.00 net pay. When it is time to record the net pay, the operator will record the \$99.00, in this case not through the "K" key but through the special key No. 1. She will then press the special key No. 2, followed with depression of the "K" key. That will cause the accumulation of special key No. 1 to be printed on the check and all of the records and subtract it from the crossfooter, and complete the check for \$99.70, which is the correct amount of the net pay. In this case the machine has again proved the accuracy of the computation. Through the use of the line lock proof, the machine here proves that each one of the amounts of earnings, deductions, etc., was correctly entered, and also proves that the operator made the correct split in the OAB tax, because she read the first amount from the total reading dial in the machine and the second amount, which was a mental calculation of the difference, must be correct in order to make the machine balance. Therefore, the machine provides 100% accuracy, even though there are mental calculations involved in an operation of this type.

Whenever the red signal is lit, warning of a split OAB tax of this type, the same electrical impulse is used to actuate a type wheel in the journal sheet section of the machine, which prints a clearly visible symbol, which will stand out so that it can be seen at a glance. The purpose of this symbol is to assist the balancing clerk in her audit. When she secures the journal sheet from the payroll of the machine operator, together with the pattern card and other records, she will glance down the sheet, providing that it is the right time of year to expect employees to go over the \$3,000.00 earnings point, and she will be able to audit the sheet quickly in order to determine if any special signals appear on the journal sheet.

Whenever she finds such a special printed signal appearing on the journal sheet, she will look for the pattern card for that particular employee and see to it that said card is turned around, so that the back of the pattern card faces the front, because the back of the pattern card has the same calculations which appear on the front, with the exclusion of the OAB calculation.

The electrical hook-up in this particular case on the \$3,000.00 mechanism is made in such a manner that it takes into consideration the earnings to date pickup key on the machine as well as the clearing key for the earnings to date. In other words, if the \$3,000.00 in the machine comes about as a result of adding sufficient earnings to the earnings-to-date pickup to make \$3,000.00, then a light is illuminated indicating this condition to the operator. However, if the pickup of the earnings to date is \$3,000.00 or more, then this mechanism also causes the machine to lock

the OAB key, so that it will be impossible to record any OAB tax on such check.

This electrical hookup also actuates a relay when the \$3,000.00 amount is secured on the pickup key, and no red light will be lit on the machine in such a condition.

The mechanism of the pattern card box also provides for holding the electrical selection, which was made on the pickup of the earnings-to-date, throughout the entire writing of the check, eliminating any possibility of interference which might occur from any source. For example, the hours keys will be used again on the recording of the overtime hours, in which case a movement would be given to the wipe switches, setting up a new selection.

However, an electrical hookup is provided in order that there will be no interference with the previous selection at the time the total hours are recorded. A relay is used in the circuit to disconnect the previously-selected hookup at the time the clock card boxes are actuated. In other words, when either one of the Net Pay keys is used and the electrical impulse is given to the pattern card box and to the clock card box, these same impulses are used to actuate a relay which cuts off all the power which was locking the electrical selection, so that the line selection will be completely wiped out on the net pay operation, and the face of the pattern card box is hooked up with the mechanism which pushes the pattern card down, so that, when the pattern card box is actuated, the mechanism in this box will restore the face of the pattern card box to its home position from whatever position it has been previously selected.

In connection with payroll operations, there are certain conditions where unusual deductions or earnings adjustments are made, for which there has been no previous pattern set up. For example, many employees might be affected by a Community Chest deduction on a payroll, which would make it impossible to complete the pattern and use any one of the net pay figures. In order to efficiently accomplish this type of set-up, provision is made on the machine to construct one of the totalizing keys in the total row to function as an indicating balance key. In other words, when that key is pressed, it will sub-total the crossfooter without printing on any of the records or spacing any of the records and only indicating the amount of the net pay in the visible total dials in the front of the machine.

Then, the operator of the machine completes the writing of the check from the pattern card up to the point of inserting the amount of the special deduction or addition, and, just prior to recording that amount on the machine, the operator will press the indicating balance key and then will check the amount which appears on the visible total dials with the amount of the correct net pay visible on the pattern card. Thus, she will prove visually that the payroll has been written correctly up to that point. She will record the amount of the special deduction adjustment in one of the special deduction or addition keys on the machine and complete the check by pressing the Net Pay key, which clears the crossfooter and prints the amount of the net pay on all of the records—namely, the check, the stub of the check, and the check register—and eject and stack the check as on the normal payroll machine operation of the type of machine shown

and described in the above-mentioned Patent No. 2,467,704.

For the purpose of illustrating one form of the present invention, the machine shown herein is constructed to perform the functions above stated, when used in connection with a machine similar to that shown in the above-mentioned Spurlino et. al. Patent No. 2,467,704, which machine is constructed primarily for the purpose of payroll work.

It is, therefore, one object of this invention to provide an accounting machine for distributing items into a plurality of classification totals, and also to provide the necessary crossfooters or add-subtract totalizers for obtaining the proper totals and balances of the various necessary items in order to produce a payroll check and the necessary records in connection therewith.

Another object of the present invention is to provide pattern cards having thereon pre-calculated amounts used in connection with the production of payroll checks, which pattern cards show the total hours, the gross pay, various deductions, and net pay amounts, according to the various deductions which have been taken from the gross pay.

Another object of the present invention is to provide a pattern card box for holding the cards so that they can be properly read by the operator while she is preparing the check to be printed by the machine.

A still further object of the present invention is to provide a line-selecting mechanism, so that the proper line of the pattern card may be selected according to the number of hours which the employee has worked.

A still further object of the present invention is to provide mechanism associated with the banks of hour keys to select the proper line on the pattern card according to the the number of hours which are set up on the hour keys.

A further object of the present invention is to provide means in the machine to signal the operator when the employee's gross pay has reached the amount of \$3,000.00, so that no further OAB tax deductions will be taken from his pay after such amount has been reached.

A still further object of the invention is to provide an electrical device associated with the differential mechanism of the hours keys, which electrical device will light up a signal light for the operator whenever the employee's gross amount has reached \$3,000.00 or more.

A further object of the present invention is to provide the pattern card box with a shifting mechanism to shift to the proper line of the pattern card and light up that line so that it may be easily read by the operator, the light determining the line which has been selected according to the number of hours which have been set up on the keyboard.

A further object of the present invention is to lock the machine against operation of the OAB key whenever the employee's gross amount has reached \$3,000.00 or exceeded that sum.

With these and incidental objects in view, the invention includes certain novel features of construction and combinations, a preferred form or embodiment of which is hereinafter described with reference to the drawings which accompany and form a part of this specification.

In said drawings:

Fig. 1 is a diagrammatic view of a keyboard of the machine used in connection with the present invention, which keyboard is to control a ma-

chine of the type illustrated and described in the above-mentioned Spurlino et al. Patent No. 2,467,704.

Fig. 2 shows an employee's pattern card with pre-calculated amounts of net pay for amounts of from 2 to 48 hours. This pattern card is broken down into tenths of hours with relation to the 39 hour periods.

Fig. 3 shows a pattern card of an employee, showing pre-calculated net pays associated with the number of hours worked, and illustrates, in five instances, $\frac{1}{4}$ -hour periods.

Fig. 4 is a view showing the switch in connection with the differential mechanism controlled by the thousand-dollar bank to cause a light to light whenever the employee's gross pay has reached \$3,000.00 or more.

Fig. 5 is a detail sectional view through one of the hour banks of the machine, showing the wipe switches in connection with this bank for selecting the proper line of the pattern card, according to the positioning of the wipe switch under control of the hour keys.

Fig. 6 is a front elevation of a preferred form of the pattern card box.

Fig. 7 is a left side elevation of the same box, showing the magnets for causing the shifting of the box face or front to select the proper group line according to the number of hours key depressed.

Fig. 8 is a section on line 8—8 of Fig. 7, looking in the direction of the arrows, and shows the solenoid-operated levers for tripping the pattern card box face to permit line selection.

Fig. 9 is a right side elevation of this same pattern card box, showing the means for restoring the box face or front to normal position at the end of the writing of a pay check.

Fig. 10 is a wiring diagram showing the controls for the pattern card box for lighting the proper light of a certain group of lines and shows the solenoids or electromagnets for selecting or adjusting the pattern card box face, dependent upon the group of keys which is depressed in the hour banks.

Fig. 11 is a front elevation of a modified form of a pattern card box, showing the selection of the lines by means of lifting a shutter.

Fig. 12 is a left side elevation of the same, showing the electromagnets for operating the shutters over the lines.

Fig. 13 is a right side elevation of the means for restoring the shutters to their normal positions.

Fig. 14 is a front elevation of a still further modified form of a pattern card box, where the line selection is made by raising a shutter or lid, which covers the lines, there being a shutter for each of the lines.

In connection with the modified form shown in Figs. 10 to 12 inclusive, the front or face of this pattern card box does not shift, there being only 16 lines which can be selected, and, therefore, it will take a pattern card with only 16 lines.

With regard to the pattern card box shown in Fig. 13, the face or front of this box shifts in the same manner as the face of the box shown in Figs. 6 to 8 of the preferred form, to select the various groups of numbers on the pattern card.

GENERAL DESCRIPTION

Described in general terms, the machine embodying the present invention is of the general type disclosed in the above-mentioned Shipley

and Goldberg patents, and particularly the patent to Spurlino et al., No. 2,467,704. These patents all disclose a plurality of totalizers into which may be distributed various amounts, according to the business system for which the machine is being built. The Spurlino et al. patent last mentioned is used particularly for payroll work, and the totalizers are adapted to receive the many and various items constituting individual transactions that are handled in the process of making out payroll checks.

The above-mentioned Shipley and Goldberg patents also disclose what are known in the art as add and subtract totalizers or crossfooters, by which name they have come to be known, from which balances may be printed at any time.

To control the printing of the various printing media, the machine has four rows of control keys and fifteen banks of amount keys, as shown diagrammatically in Fig. 1. The amount keyboard is what is known in the art as a split keyboard. The first six rows of amount keys on the left side control amounts to be added into the left-hand side of a split totalizer, and the nine banks to the right of this indicated split control amounts to be added into the right-hand side of the split totalizer.

The machine as shown in the last-mentioned Spurlino et al. patent is adapted to print on an earnings record card to the right of the machine and on a check near the center of the machine, and a payroll summary is adapted to be fed and printed upon at the left of the machine.

The four rows of control keys at the right side of the keyboard control the selection of the columns and the selection of the various line spaces in the columns to receive the printed data according to the several operations of the machine necessary to complete a payroll check writing and issuing transaction.

The number of operations, of course, varies with the number of types of earnings to be credited to each employee, and also varies with the number of deductions chargeable against the gross earnings of each employee. As has been previously stated, the time clock card box and the pattern card clock box are located on top of the machine, and stacks of pattern cards and stacks of time clock cards are put in the respective boxes in proper sequence, according to employees. In other words, the first card on each stack will be for the same employee, the second card for the next employee, and so on through the stack, and, upon the depression of the Net Pay key, which is the final operation of writing an employee's payroll check, these cards are simultaneously ejected from their respective boxes to present to view the second card in each box. The line of the pattern card to be selected is under control of the keys headed "Hours" in Fig. 1, the keys depressed in the hours bank determining which of the lines of the pattern card are to be selected, causing a shifting of the front or face of the pattern card box to select the proper line in the group after the group has been selected.

DETAILED DESCRIPTION

Keyboard

The keyboard of the machine is shown in diagrammatic form in Fig. 1. There are six rows or banks of amount keys 60, to the left of a permanent "split," indicated by a dotted line, and to the right of this split there are nine rows or banks of amount keys 61. This gives a register-

ing and accumulating capacity of six banks to the left of the split and nine banks to the right of the split for the totalizers in the machine, which are split according to the permanent split between the keys 60 and 61 in a manner well known in the art.

To the right of the amount keys 60 and 61 are four rows of control keys designated "Row 1," "Row 2," "Row 3," and "Row 4." Keys 62 of row 1 are operating keys; that is, they release the machine for actuation when depressed. Key 63 is a non-operating key and is used in conjunction with the "K Earnings-to-Date" key of row 2. The top three keys 64 of row 1 are non-operating keys and are used to select the totalizers corresponding to the keys of rows 2, 3, and 4, during clearing operations.

The keys of row 2 are designated 65, the keys of row 3 are designated 66, and the keys of row 4 are designated 67.

The "X," "Y," and "Z" keys 68 of row 2 are used to pick up the totals of earnings to date, bond balance to date, and tax to date, respectively, prior to the writing of an individual payroll check. The remaining keys in this bank are used during analysis operations. The functions of the three bottom keys of row 2 have been previously mentioned generally and will be more fully given later.

The "K Net Pay" key 66 of row 3 is used to make the final printing of the net pay on the employee's check. The remaining keys, L to U, in this row 3 are used to set up the various deductions, which may be applicable to any employee.

The keys 67 of row 4, marked "A" to "J," are used in connection with the writing of payroll, according to the designation on the keys opposite the letters.

The keys of rows 2, 3, and 4 select various totalizers in the machine in a manner which has been fully illustrated and explained in the previously-mentioned Spurlino et al. Patent No. 2,467,704.

Differential mechanism for hours and amount banks

The differential mechanisms for each of the key banks 60 and each of the key banks 61 are identical, and in Fig. 5 there is shown a cross-section of the machine alongside one of the banks of keys 60. This differential mechanism, as above mentioned, being identical with the differential mechanism for the amount keys, it is thought that a description of this differential mechanism will suffice for all banks of amount keys and hours keys.

Moreover, the key bank frames for the keys 60 and 61 are identical, as is the zero stop mechanism for these different banks of keys, and therefore the description of the bank of keys 60, and its supporting framework, shown in Fig. 5, will suffice for all.

The keys 60, which are used in this case to record the number of hours worked, are mounted in the usual key frame 71, supported by rods 72 and 73, which in turn are supported by machine side frames 74 (only one of which is shown). The keys all cooperate with a detent 75 having a flattened pin 76, which retains the key in its depressed position, as fully illustrated and described in the above-mentioned Shipley patents.

This detent 75 is pivoted to an arm 77, which, through a pin 78, an arm 79, and a shaft 80, rocks a zero stop pawl 81 for this particular denomination counterclockwise out of the path of a reset spider 82, free on a hub of an amount differential

15

actuator 83, rotatably supported by a hub 84 extending between two similar amount differential support plates 85 (only one shown) in turn supported by rods 86, extending between and supported by the machine side frames 74. There is a pair of support plates 85 for each amount differential, and a tie rod 87 extends through the holes in the center of the hubs 84, to secure all of the amount differentials in a compact unit. The reset spider 82 has a slot in its forward end, which engages a stud 91 in a bell crank 92, pivoted on an extension of a differential actuator 83. This bell crank 92 is connected by a link 93 to a latch arm 94, which is pivoted on the differential actuator 83. The upper end of the arm 94 has a foot 95, which cooperates with a shoulder 96 on a driver 97, which receives a regular excursion clockwise and then counterclockwise to its normal position each operation of the machine. A spring 98 holds the foot 95 of the latch arm 94 in engagement with the driver 97. The driver 97 is pivoted on the hub 84 of the differential actuator 83 and is connected by a link 99 to a lever 100, pivoted on a stud 101 supported by the plate 85. The lever 100 carries rollers 102 and 103, which cooperate, respectively, with the peripheries of companion plate cams 104 and 105, secured to a main drive shaft 106. This main drive shaft 106 receives its motion by the usual mechanism, which is fully illustrated and described in the above-mentioned Shipley patents, but which is not shown herein.

Depression of any one of the keys 60 moves its lower end into the path of a forward extension 111 of the bell crank 92, and operation of the machine causes the cams 104 and 105, as previously described, to make one complete revolution in adding and/or subtracting operations to rock the lever 100 and the driver 97 clockwise, whereupon the latch foot 95 carries the differential actuator 83 and the spider 82 clockwise in unison therewith until the extension 111 of the bell crank 92 engages the end of the depressed key 60. When this occurs, the bell crank 92 is rocked counter-clockwise, whereupon the link 93 rocks the latch arm 94 counter-clockwise, disengages the foot 95 from the shoulder 96 of the driver 97, and causes a nose 112 on an extension of the link 93 to engage with the proper one of a series of alining notches 113. These notches 113 correspond to the differential positions of the differential actuator 83 and are cut in a plate 114 supported by extensions of the plate 85 and the rod 86. This positions the differential actuator 83 according to the value of the depressed key 60 without interfering with the oscillating movement of the driver 97 and connected parts. After the latch arm 94 is disengaged from the shoulder 96 of the driver 97, an arcuate surface 115 on the periphery of the driver 97, in cooperation with the sole of the foot 95, locks the latch in the corresponding notch 113 to retain the differential mechanism in set position.

When the lever 100 reaches or nears the terminus of its initial movement clockwise, a roller 120, carried thereby, engages the under surface 121 of a beam 122 pivotally mounted on the differential actuator 83 and forces an arcuate upper surface of the beam to contact with an undercut portion of the hub 84 to position said beam 122 in proportion to the value of the depressed key 60. The rear end of the beam 122 embraces a stud 123 of a link 124 pivotally connected at its upper end to an alining segment 125 secured to one of the nested sleeves 126

16

mounted on a shaft 127 supported by the side frames 74. This aliner segment 125 has alining notches 128 to cooperate with a liner 129, mounted on a shaft 130. This liner alines all amount differential actuators 83.

At its lower end, the link 124 is also pivotally connected to a printer positioning segment (not shown herein) to set up and control the printing mechanism to print amounts according to the keys depressed, which has been fully illustrated and described in the above-mentioned Shipley patents.

The mechanism described above transmits the differential positioning of the beam 122 to the segments 125, so that at each operation of the machine the segment 125 is set and left set in the position according to the key 60 which has been depressed.

The positioning of this segment 125 controls the positioning of wipe switches, which will be hereinafter described and which are connected to the hours banks.

The machine is provided with the usual cabinet or casing 135, a portion of which is shown in Figs. 5, 7, 9, and 12. This casing 135 is provided with the usual openings closed by hinged covers and provided with locks to prevent any unauthorized persons from tampering with any of the mechanisms.

Differentially controlled switches for line selection on the pattern card

Associated with each of the hours banks of keys 60 is a differentially controlled switching mechanism for the purpose of selecting the proper line of the pattern card under the control of the number of hours which the employee has worked. Only one of these switching mechanisms is shown in mechanical detail, this being in Fig. 5. The remaining switches are shown diagrammatically on the wiring diagram in Fig. 10. The one in Fig. 5 is associated with the units hours bank and will now be described.

Mounted on the cabinet 135 above the units hours keys 60 is a casing 140, carrying a plate 141 of insulating material upon which are supported pairs of electrical terminals 142 mounted one on each side of the plate 141. These pairs of electrical terminals are arranged in positions corresponding to the 0 to 9 positions of the differential mechanism. The terminals 142 are held in place by a pair of insulating plates 143, one of which is secured on each side of the plate 141. Cooperating with the pairs of terminals 142 is a pair of wipers 144 (only one of which is shown), which are connected together and carried by but insulated from an arm 145, secured to the differentially positionable lining segment 125 associated with this units of hours bank of keys 60.

It will be recalled that this alining segment 125 is differentially positioned by the beam link 124 under control of the differential mechanism, which in turn is controlled by the keys 60 in this particular bank.

Consequently, when the segment 125 is differentially positioned, the arm 145 is likewise positioned to move the pair of wiping contacts 144 to the position corresponding to the differential setting of the member 125 under control of the beam link 124, the beam 122, and the differential mechanism, the ultimate position of which is determined by the key 60 which has been depressed.

\$3,000.00 switch mechanism

As has been previously mentioned, the ma-

chine is provided with an electrical switch which feels the position of the differential mechanism associated with the \$1,000.00 bank of keys 61, so that, when the differential mechanism for this \$1,000.00 bank of keys is in a position to record \$3,000.00 or more, the differential causes the electrical switch to close, thus sending an electrical signal to a red lamp located on top of the machine. When this lamp is lighted on the clearing or extension of the Earnings to Date total, the operator of the machine will know that the particular employee has just completed earnings of \$3,000.00 or more. In this case, the operator will split the amount of the OAB tax on that particular check depending upon the amount of the man's earnings, whether it be exactly \$3,000.00 or above \$3,000.00.

The above condition arises when, for example, the pickup was \$2,970.00 and the man earned for that particular week \$100.00, which would make his total \$3,070.00. Then the amount of OAB to be deducted would be split according to the amount which was necessary to reach the \$3,000.00 mark; or, in other words, the OAB would be taken on the amount of \$30.00 only.

This particular switch also operates on the pickup of the earnings to date whenever the amount of the earnings to date is \$3,000.00 or more. In such a case, the OAB key 61 is locked, so that it is impossible to record any OAB tax in connection with such a check.

This switch mechanism is shown in Fig. 4 and will now be described. Alongside the alining segment 125 which is associated with the \$1,000.00 bank of keys 61 is a permanently-mounted bracket 150. Mounted on the bracket 150 by means of a switch block 151 is a switch 152, composed of blades 153 and 154. The blade 154 is resting on an insulating block 155 carried by the stationary bracket 150. Pivoted to the stationary bracket at 156 is an arm 157 made of insulating material, which arm carries an insulating block 158 having a curved bottom surface. This block 158 cooperates with a stud 159 carried by the alining segment 125 of this \$1,000.00 amount bank. The block 158 is normally held in contact with the stud 159 by a spring 160, mounted on the switch block 151.

In Fig. 4, the alining segment 125 and all of the parts are shown in the zero position. When this alining segment 125 is in its zero position or has been set to its 1 position or the 2 position, the stud 159, of course, is moved downwardly, and the spring 160 causes the the block 158 to follow the stud, thus rocking the arm 157 clockwise a corresponding distance, which, however, is not sufficient to cause the closing of the notch 152.

However, when the segment 125 reaches the 3 position, the stud 159 then permits the block 158, under the influence of the spring 160, to be moved farther downwardly, thus rocking the arm 157 a distance sufficient to cause it to bear on the switch blade 153 and cause this blade to contact the blade 154, and thus close the switch 152. When this occurs, a circuit is set up, which will be described later, to light up, as previously mentioned, a red light 161, shown in Fig. 5, to indicate to the operator of the machine that the person whose payroll check is being written has in his Earnings-to-Date for the year reached the amount of \$3,000.00 or more.

Differential mechanism for control bank

The differential mechanisms for the control

banks shown in row 1, row 2, row 3, and row 4 of Fig. 1 are not shown in this particular application, but the differential mechanisms for the banks of control keys shown and described in the above-mentioned Spurlino et al. Patent No. 2,467,704 are the same type of mechanism which can be used in connection with the control keys in the present application, and reference may be had to this patent for such mechanisms for illustration and description thereof.

Totalizers

The machine shown in this application has the three usual lines of totalizers, numbered 1, 2, and 3 in Fig. 5. As before stated, the totalizers on each of these lines are split between the keys 60 and 61 (Fig. 1); that is, there is no transfer mechanism between the totalizer wheels associated with the first left-hand bank of keys 61 and the first right-hand bank of keys 60 in connection with their respective differential mechanisms.

The No. 1 line (Fig. 5) has on the right hand of the split, a balance totalizer or crossfooter and also one straight adding totalizer. On the left of the split, the totalizer line may have two adding totalizers on it, such as that described in the above-mentioned Spurlino et al. Patent No. 2,467,704.

The No. 3 or front totalizer line, which is controlled by the keys 66 of row 3, has nine totalizers on each side of the split, one for each of the keys K to U, and one in the zero position, herein called the "GT3" totalizer.

The rear or No. 2 totalizer has nine adding totalizers on each side of the split, one for each of the keys A to J, and also one in the zero position, called the "GT4" totalizer.

The No. 1 or upper totalizer line has crossfooters and also regular adding totalizers thereon, as above mentioned. Such construction is illustrated in the United States patent issued to Pascal Spurlino, William M. Carroll, Arthur R. Colley, and Alfred G. Kibler, No. 2,375,594, granted on May 8, 1945. If any further information is needed or desired with reference to such totalizer lines having crossfooters and straight adding totalizers thereon, reference may be had to that patent.

The crossfooter on the upper or No. 1 line (Fig. 5), which is the crossfooter at the right of the split, is indicated by the reference number 165. The totalizers on the No. 2 or back line are numbered 166. This number applies to the totalizers on both sides of the split. The totalizers on the front or No. 3 line are numbered 167, and this number likewise applies to the totalizers on both sides of the split.

Totalizers of this type are old and well known in the art, are known as interspersed totalizers, and are fully illustrated and described in the previously-mentioned Shipley patent, and, therefore, no further description of the construction of these totalizers is felt necessary herein.

As usual in machines of this type, the actuators 83 are divided into three tooth sections, Nos. 168, 169, and 170. The section 168 actuates the crossfooter and also the regular totalizers on the No. 1 or upper totalizer line, the section 169 actuates the totalizers 166 on the No. 2 or rear line, and the tooth section 170 actuates the totalizers 167 on the front or No. 3 line.

In adding operations, the wheels of the selected totalizer or totalizers, as the case may be, are engaged with their respective sets of actuating

tooth sections 168, 169, and 170 of the actuators 83, after the actuators have completed their setting movements in a clockwise direction under the control of the keys 60 and 61.

In subtract operations, the corresponding subtract wheels of the crossfooter 165 are engaged with the tooth sections 168 of the actuator 83 exactly the same as in adding operations, and the return movement of the actuator reversely rotates the adding wheels 165 of the crossfooter through the reverse gearing, which is well known in the art and shown in several of the above-mentioned Shipley patents, and also in the Spurlino, Carroll, Colley, and Kibler Patent No. 2,375,594.

Counter-clockwise return movement of the actuators 83, as explained above, rotates the corresponding wheels of the selected and engaged totalizer or totalizers in proportion to the value of the depressed keys 60 and 61, to enter into said totalizers the amounts corresponding to the keys which have been depressed.

If no amount key 61 is depressed, the zero stop pawl 81 remains in the path of the spider 82 upon the initial movement of the actuator 83 and engages said spider and disengages the latch 95 from the driver 97 to arrest the actuator 83 in the zero position. After the actuator 83 is positioned at zero, the roller 120 positions the beam 122, the link 124, and the segments 125 in proportion thereto, as is well known in the art.

At the end of every type of operation, the actuator 83 is always returned to home position, as shown in Fig. 5. However, the links 124 and the printing mechanisms controlled thereby, and also the segments 125, remain in set positions at the end of machine operations and are moved directly from these positions to their new positions in the succeeding operations of the machine through the beam mechanism, which is old and well known in the art and is often referred to as the "minimum movement device." The usual transfer mechanism is provided for entering one unit in the next higher order of the totalizers when the lower order totalizer wheel passes through zero in either positive or negative direction.

The mechanism for engaging the totalizers with the actuators and disengaging them from the actuators during adding, subtracting, reading, totalizing, or transfer total operations is not shown in this application, but for a description of such mechanism and its operation, reference may be made to the above-mentioned Spurlino et al. Patent No. 2,467,704, in which said mechanisms are illustrated and described, so that the totalizers in the present application are adapted to perform all of the functions necessary with the accumulating and recording of all types of additions, subtractions, reading, totalizing, and transfer total operations that are necessary in connection with the production of a payroll and the issuing of employees' payroll checks, and the keeping of other records in connection with this type of work.

Pattern cards

In Fig. 2 there is illustrated a facsimile of a pattern card 171 used in connection with the present invention and having thereon columns of pre-calculated figures showing amounts of net pays, according to the number of hours which the employee worked. On each card there will be the employee's name, his clock number, and the rate per hour.

In the left-hand column, headed "Hours," it is

seen that the hours run from 2 to 48, and below this there is a group of hours listed 39.5, 39.6, 39.7, 39.8, and 39.9, which represent tenths of hours from .5 to .9, in connection with the 39 hours worked. The second column, headed "Base Pay," is in fact the gross pay earned by the employee, according to the number of hours worked. The third column, headed "Overtime Pay," shows overtime amounts in connection with the 42, 44, 46, and 48 hours.

The next column, headed "OAB," is the amount which the operator deducts, depending upon the number of hours and base pay. The next column, headed "Withholding Tax," is the amount of income tax withheld according to the number of hours worked. The next four columns, under the main heading "Net Pays," are net pays when certain deductions are made. The first column under "Net Pays" and headed "No Other Deductions" represents the net pay which the employee will get when there are no other deductions outside of the OAB and withholding tax. The column headed "Union Dues" shows the net pay when the union dues are withheld in addition to the OAB and the withholding tax. The next column, headed "Insurance," shows the net pay when the insurance is deducted from the employee's net pay in addition to the OAB and the withholding tax, and the last or right-hand column, headed "Hospital," shows the employee's net pay when hospitalization insurance is deducted in addition to the OAB and the withholding tax.

Below these columns of figures there are six lines of figures. The first line shows earnings based on fractional hours in tenths, the next line shows the balance factor to be taken into consideration in connection with those fractional earnings, the next line shows earnings for one full hour and also for that full hour plus each fractional tenth of hour from 1.1 to 1.9 inclusive, the next line or next to last line shows the balance factor for the earnings from 1.0 to 1.9 hours and the last line indicates the hours and fractions applicable to each row of figures.

From the above chart it can be seen that, if an employee worked 34 hours, this line, by means to be hereinafter described, will be selected, which shows that the man's base pay is \$44.03, that he will have 44 cents deducted for OAB and \$2.80 deducted for withholding tax, and that if he has no further deductions his net pay will be \$40.79. However, should the man belong to the union and should it be the week during which union dues are being deducted, then his net pay would be \$39.29. If on another week insurance is deducted, the man's net pay will be \$38.69, and finally if on another week hospitalization is deducted, then his net pay will be \$34.54.

Should an employee work, for example, 34.6 hours, the operator will set up the \$44.03, which amount will be accumulated in the total in connection with that key depressed, which will be the No. 1 special key. She will then read from the special chart at the bottom of the pattern card, which amount appears in the position for .6 hour, which is the difference between 34 hours and 34.6 hours. This amount, it will be noticed, is the fractional earning and shows 78 cents, which will be recorded on the keyboard and added to the \$44.03 using special key #1. This makes a total of \$44.81 which is printed by pressing special key #2 followed by 67 key B. Now, in deducting the OAB, instead of deducting 44 cents, she will deduct 45 cents, and the withholding tax, instead of deducting \$2.80, she will deduct \$2.90.

She will then read the proper net pay figure appearing on the pattern card for 34 hours, which is \$40.79. She will record that on the keyboard and operate the machine with special key #1 and then read from the special chart at the bottom of the pattern card in the balancing factor, and find that this figure is 67 cents. She will then record this amount through the special No. 1 key. She will then press the special No. 2 key, followed by the depression of the Net Pay key 66, which causes the amount normally to be printed on the check, for the total amount of the accumulator associated with the special key No. 1. That amount will be transferred into the totalizer associated with the "K Net Pay" key 66 and subtracted from the crossfooter and printed on all records, and the amount so printed will be \$41.46, which is the total of \$40.79 plus the balancing factor of 67 cents.

The pattern card 172 shown in Fig. 3 is used in the same manner as the pattern card shown in Fig. 2, except that in pattern card No. 3 certain groups of hours are broken down into quarter-hour periods for which the operator can directly read the base pay and all of the net pays. In connection with this chart, there is no need for the six lines of computing figures to be used, such as shown in the pattern card in Fig. 2, and therefore none are shown on this pattern card in Fig. 3. This card shows that, if a man, for example, worked 47½ hours, his gross pay would be \$61.51, his overtime pay would be \$4.86, his OAB deduction would be 66 cents, his withholding tax would be \$6.20, and his net pay—if no other deductions are made—would be \$59.51. If it was the week that union dues were deducted, then his net pay would be \$58.01; if it was a week when insurance was deducted, his net pay would be \$57.41; and if it was the week when hospitalization was deducted, his net pay would be \$53.26.

Thus, it can be clearly seen that, by the use of either one of these two pattern cards shown in Figs. 2 and 3, all the operator needs to do is to know the number of hours worked, whereupon the direct amount of gross pay, overtime pay, all deductions, and four different net pays can be readily read from these cards to be set up in the machine without the operator's having to figure all of the net pays or without some other group of persons having to sit down and calculate these, whether it be done by constant figures on charts or otherwise, and then give them to the person who is writing the payroll checks. In this manner, the speeding up of the writing of payroll checks—that is, by the use of these pattern cards—is accomplished without a lot of undue work ahead of time by other departments.

Pattern card box

In Figs. 6 to 9 inclusive is illustrated the preferred form of pattern card box, which is used in connection with the present invention to house stacks of employees' pattern cards when the payroll for those employees is being written. In Fig. 9 are shown a few of the pattern cards 171 stacked in the box. These cards are, upon operation of the Net Pay key 66, adapted to be ejected one at a time from the box as the employee's payroll check is completed. The ejection of the card is accomplished by mechanism which is fully illustrated and described in the above-mentioned Spurlino et al. Patent No. 2,467,704, which mechanism in that patent ejects the time clock card in connection with that particular patent.

The pattern card box used is very similar to

the clock card box shown in the patent just mentioned. The clock card box shown in said patent has a fixed face or front with an opening through which the clock card is visible, whereas in the pattern card box the front or face of the box is adjustable from a normal position, shown in Figs. 6, 7, and 9, to any one of four other positions below such position. Moreover, this face or front of the pattern card box carries lights which are lighted up to show up the line which has been selected for the operator to read in order to write the employee's payroll check. The face of the box is provided with slots, so that only certain lines are visible at a time, and the line to be used is the line which is lighted up by the light for the group of lines of which the selected line is one.

This pattern card box will now be described. A pattern card box 180 (Figs. 6, 7, and 9) is mounted on a T-shaped bar 181, secured to the back of a machine cabinet 135. The box has a base partition 182, upon which the pattern cards 171 are stacked and held in contact with one another by a weighted slide 183. The base 182 slopes, so that the natural tendency of the cards when pushed by the weighted slide 183 is for the first or front card to engage the back side of a slide 184 carrying a card picker or card ejector 175. This slide 184 lies just to the rear of an adjustable front or face 185 of the pattern card box. As the cards are ejected one at a time after the employee's payroll check has been written, the cards engage a slide 178, so that they will slide downwardly and be stacked, in proper order, in the bottom of the pattern card box 180. The box is provided with an opening covered by a cover 179, so that the cards may be removed from the pattern card box 180 after all of the checks of the particular batch of cards have been written.

As shown in Fig. 6, the box face 185 is provided with five slots, numbered 186, 187, 188, 189, and 190, and a larger opening, the upper edge 191 of which acts as a line guide. Above each of the slots 186 to 190 and the opening 191 is a housing 192 for an electric lamp 193.

When the face 185 of the pattern card box is in its normal position, as shown in Figs. 6, 7, and 9, the lines of figures on the pattern card 171 (Fig. 2) corresponding to the employee's name, which is in a 0 hour position, 10 hours, 20 hours, 30 hours, and 40 hours, are visible through the slots 186, 187, 188, 189, and 190, respectively, and the line corresponding to the 39.9 hours is visible just beneath the edge 191.

If the employee worked 40 hours, then the lamp 193 in the housing 192, just above the slot 190, will be lighted so that the operator knows that this is the line to read because the person whose check is being written worked 40 hours, and upon depression of the 40-hour key and during the operation of the machine conditions were set up to be hereinafter described to complete a circuit, so that the above-mentioned lamp in the housing above the slot 190 will be lighted.

Secured to the back of the face 185 near its top are two brackets 195 and 196, and secured to the back of the face 185 near its bottom are two brackets 197 and 198. Each of the brackets 195 to 198 has a slot 199, through which extends a stud 200 carried by a pattern card box 180. These brackets 196 to 198 and the studs 200 serve as sliding guides for the face 185 during its adjustment from the position shown in Figs. 7 and 9 downwardly into any of its other four adjusted positions.

When the face 185 is adjusted into its lower-

23

most position, the tops of the slots 199 strike the studs 200 and act as stops for the final movement downward. Secured to each side of the pattern card box 180 are upstanding brackets 201 and 202, which support a shaft 203. Secured to the shaft 203 is an arm 204 having a slot 205, which surrounds a rod 206 supported by the brackets 195 and 196.

Also secured to the shaft 203 (Fig. 7) is a lever 207 having a slot 208, which surrounds the rod 206. The lever 207 carries a stud 209 (Fig. 9), which extends through a slot 210 in the upper end of the link 211 to connect this link 211 with the rear end of the lever 207.

Secured to the shaft 203 is an arm 212 having a pin 213, which cooperates with four hook levers 214, 215, 216, and 217, all of which are pivoted on a stud 218 mounted in a plate 219 secured to the side of the pattern card box 180.

Referring to Figs. 7 and 8, it will be seen that the hook lever 214 has a flange 220 with a bent-up ear 221, to which is pivoted a link 222, which is also pivoted to a core 223 of a solenoid 224. The flange 220 normally rests against a stud 225, carried by the plate 219.

The hook lever 215 has a bent-over flange 226, which lies beneath the hook lever 214. This flange 226 has an upturned ear 227, to which is pivoted a link 228, which is also pivoted to a core 229 of a solenoid 230. This flange 226 normally rests against a stud 231 carried by the plate 219.

The hook lever 216 has a right-angled flange 232, which lies beneath both of the levers 214 and 215. This flange 232 has an upturned ear 233, to which is pivoted a link 234, also pivoted to a core 235 of a solenoid 236. This flange 232 normally rests against a stud 237, carried by the plate 219.

The hook lever 217 has a right-angled flange 238, which lies just beneath all three of the levers 214, 215, and 216. This flange 238 has an upturned ear 239, to which is pivoted a link 240, also pivoted to a core 241 of a solenoid 242. This flange 238 normally rests against a stud 243, carried by the plate 219.

The operation of the above-described mechanism is as follows:

Normally, the hook levers 214, 215, 216, and 217 are in the positions shown in Fig. 7, whereupon the arm 212, the shaft 203, the lever 207 and the arm 204 retain the pattern card box face 185 in the position shown, so that the lines on the pattern card 171 opposite the 10, 20, 30, and 40 hours are visible through the slots 186 to 190, respectively, in the face 185.

By means to be later described in connection with the description of the wiring diagram, the solenoids 224, 230, 236, and 242 are adapted to be energized under control of the keys in the hours banks.

Upon energization of the solenoid 224, its core 223 is moved upwardly, thus rocking the hook lever 214 counter-clockwise and releasing the stud 213 of the arm 212. When this occurs, the pattern card box face 185 moves downwardly, thus, through the arm 204 and the lever 207, rocking the shaft 203 and the arm 212 clockwise until the stud 213 contacts the hook lever 215 and is stopped by such lever. Such movement of the pattern card box face 185 positions the slots 186 to 190, respectively, opposite the lines on the pattern card 171, which correspond to the 2, 12, 22, 32, and 42 hours, respectively, so that the figures in connection with these numbers of hours may be read through their respective slots.

24

However, as has been previously pointed out, the particular line which is to be read is illuminated by means of its associated lamp 193, which is selected, as above mentioned, under control of the hours keys.

The means for restoring the pattern card box face 185 upwardly to its normal position will now be described. Secured to a shaft 251 (Fig. 9), carried by the pattern card box 180, is a plate 252. This shaft 251 and plate 252 receive one full counter-clockwise rotation, by means which is fully illustrated and described in the above-mentioned Spurlino et al. Patent No. 2,467,704, whenever the Net Pay key 66 is operated.

Pivoted at 253 to the plate 252 is a crank 254, which is pivoted at 255 to the previously-described link 211. The upper end of this crank 254 is connected, by means illustrated and described in the last-mentioned Spurlino et al. patent, to the previously-mentioned pattern card picker 175.

Upon the counter-clockwise movement of the plate 252, the crank 254 receives a movement downwardly from the position shown in Fig. 9 and back to that position. Upon downward movement of the crank 254, the picker 175 ejects the front pattern card 171 of the stack downwardly sufficiently to cause it to be gripped by the feed rolls 176, whereupon it is fed downwardly over the plate 178 and into the bottom portion of the pattern card box 180. As the crank 254 is moved downwardly, it draws the link 211 downwardly until the top edge of the slot 210 contacts the stud 209 in the lever 207, whereupon continued downward movement of the crank 254 rocks the lever 207, the shaft 203, and the arm 204 clockwise, as viewed in Fig. 9, and counter-clockwise as viewed in Fig. 7, whereupon the arm 204 and the lever 207, due to the fact that they are connected to the brackets 195 and 196, respectively, of the face 185 of the pattern card box, raise the pattern card box face 185 upwardly to its normal position. This, of course, occurs after the solenoid 224 has been de-energized, and thus the stud 213 of the arm 212 will be moved, from its position in engagement with the lever 215, back to the position shown in Fig. 7, into engagement with the hook lever 214, thus retaining the face 185 of the pattern card box in its upper or normal position.

When the solenoid 230 is energized, its core 229 is raised, thus rocking the hook lever 215 counter-clockwise, whereupon its flange 226 also rocks the lever 214 counter-clockwise, and the face 185 slides downwardly and rocks the arm 212 clockwise until the stud 213 contacts the hook lever 216, whereupon the face 185 is stopped in such position. In this position, the slots 186 to 190, respectively, of Fig. 6 are positioned over the lines on the pattern card 171 corresponding to the 4, 14, 24, 34, and 44 hour designations on this card, so that the operator may read the particular one of these lines which is lighted up by its associated lamp 193.

After this selection of lines, and during the last of the machine operations necessary to the issuance of the payroll check, which last operation, as above mentioned, is initiated by depression of the Net Pay key 66, the pattern card is ejected by the picker 175, and the face of the box 185 is restored by the crank 254 (Fig. 9), as previously described.

When the solenoid 236 is energized, its core 235 raises the link 234 and rocks the hook lever 216 counter-clockwise, and, during this rocking,

25

the flange 232 of this lever also rocks the levers 215 and 214 counter-clockwise, whereupon the downward movement of the face 185 is limited when the stud 213 contacts and is held by the hook lever 217. In this position of the face 185, the lines opposite the hours 6, 16, 26, 36, and 46 are visible through the slots 186 to 190, respectively.

If during another operation of the machine the solenoid 242 is energized, its core 241 raises the link 240 and rocks the hook lever 217 counter-clockwise. At this time, the flange 238 of the lever 217 rocks the levers 214, 215, and 216 counter-clockwise, whereupon the face 185 is lowered until the top edges of the slots 199 contact their associated studs 200, and at the same time the stud 213 is moved beyond all of the hook levers 214 to 217 inclusive, thus positioning the slots 186 to 190, respectively, opposite the lines on the pattern card 171 corresponding to the 8, 18, 28, 38, and 48 hours. Now, when the associated light 193 of the selected line group is lighted, the operator knows that that is the line which she is to use because of the particular hour keys which have been operated to select that particular line.

Clock card box

As pointed out in the early part of this specification, there is used in connection with the pattern card box 180 a clock card box, in which are stacked employees' clock cards or time cards, which show the number of hours the employee has worked, and these cards are stacked in conformity with the stacks of pattern cards 171; that is, the front card on the stack of clock cards and the front card on the stack of pattern cards relate to the same employee.

A clock card box 245 is shown diagrammatically in the wiring diagram of Fig. 10 and is like the one illustrated and fully described in the above-mentioned Spurlino et al. Patent No. 2,467,704, which patent describes a payroll system and the production of employees' payroll checks. Therefore, if any reference is desired in connection with the clock card box 245, attention is directed to this last-mentioned Spurlino et al. patent.

Wiring diagram circuits

In connection with this electrical circuit diagram, the source of power for several of the circuits is indicated by a battery symbol, which battery has one side grounded.

As has been previously stated, the selection of the line to be used on the employee's pattern card 171 (Fig. 2) is accomplished by the solenoids 224, 230, 236, and 238, under control of the keys 61 in the units of hours bank.

The operation of the above-mentioned solenoids has been previously described; that is, it has been previously stated how the energization of certain ones of these solenoids controls the positioning of the arm 212 (Fig. 7) so as to determine the positioning of the face 185 of the pattern card box 180.

It is not thought necessary to describe all of the circuits in connection with the selection of these solenoids, and energization thereof to in turn control the selection or adjustment of the contacts in the electrical differentials associated with the tens hours, the units hours, and the tenths hours banks. The circuits which they establish during their differential movements under the control of the keys in these banks are

26

illustrated diagrammatically in the wiring diagram in Fig. 10.

In connection with the tens hours bank, there are five pairs of electrical terminals 271 in the 0, 1, 2, 3, and 4 positions. The right-hand ones of these pairs of terminals 271 are connected to a bar 272. Also, in connection with this bank is a pair of contacts 273 in the 3 position, the left-hand one of which is connected to a bar 274. Cooperating with these pairs of terminals 271 and 273 is a pair of wipers 275, which are connected together in the diagram by a heavy line so as to represent the fact that they travel in unison. Associated with the units hours bank are ten pairs of terminals 276 in the 0 to 9 positions, the right-hand terminal of each pair being connected electrically to a bar 277. Also associated with this units of hours bank are five pairs of terminals 278 in the 0, 2, 4, 6, and 8 positions. The left-hand ones of each of these pairs of terminals 278 are connected electrically to a bar 279. Also associated with this units of hours bank is a special pair of terminals 280, the left one of which is connected to a bar 281. Associated with these terminals 276, 278, and 280 is a pair of wipers 282, which are non-electrically connected together, as represented by the heavy black line, so that they will move in unison.

Associated with the tenths of hours bank are four pairs of terminals 285, the left-hand ones of which are connected electrically to a bar 286. These pairs of terminals 285 are in the 5, 6, 7, and 8 positions. Also associated with these terminals is a series of single terminals 287, connected to a bar 288. These terminals 287 are in the 5, 6, 7, 8, and 9 positions. In the 0 position directly beneath the bar 288 are a bar 290 and a terminal 291. Associated with these terminals and bars in the tenths of hours bank is a pair of wipers 292 electrically connected by a bar 293.

Assuming now that an employee's time clock card shows that he worked 34 hours and that the same employee's pattern card 171 is on the front of the stack of cards in the pattern card box 180, the depression of the "3" key 61 in the tens hours bank and the depression of the "4" key 61 in the units hours bank completes circuits as follows, to select the 34-hour line and to light the lamp 193 associated with the group of lines 30 to 38 hours.

When the units differential under the control of the 4-hour key travels to the 4 position, a circuit is completed from the battery 300 through the bar 290 over the left-hand wiper 292, bar 291, and line 301 to the bar 279, then through the right-hand wiper 282 by means of the pair of contacts 278 to line 302 around to bar 277 through the pair of contacts 276 in the 4 position by means of the left-hand wiper 282, and then through line 303 to the solenoid 230 to the ground, thus energizing this solenoid. The energization of this solenoid 230, as has been previously described, rocks levers 214 and 215 counter-clockwise, thus releasing the stud 213 and the arm 212, whereupon the face 185 of the pattern card box drops down two steps, so that the slot 189 of the 30-hour group is positioned opposite the 34-hour line on the pattern card 171. At the same time, a circuit is completed from the line 302 over lines 304 and 305 to the bar 272 and then through the terminals 271, in the 3 position, then through the left-hand wiper 275, thus over line 306 to a relay 307 to the ground, thus energizing this relay 307, which pulls up its armature 308 and completes the circuit, later de-

scribed, to the lamp 193 associated with the 30-hour group of lines on the pattern card 171.

Associated with and adapted to be controlled by an ejected clock card and an ejected pattern card, respectively, are switches 311 and 312. The specific control of these switches will be described later.

These two switches 311 and 312 are wired in parallel. The circuit through switch 311 is from a battery 313, through the switch 311, line 314 to point 315. The circuit through the switch 312 is from a battery 316, switch 312, and line 317 to point 315. From point 315, a circuit is established through a normally closed manually operable switch 318 to point 319.

When the relay 307 is energized in the manner above described and pulls up its armature 308, a circuit is then completed from point 319 over line 320, line 321, armature 308, line 322, to the lamp 193 to ground. This particular lamp 193 is associated with the 30-hour group of lines on the pattern card 171, thus lighting up the selected 34-hour line.

As has been previously pointed out, the hours are set up on the keyboard at the same time the employee's earnings to date is set upon the keyboard.

If the employee's earnings to date when it is picked up is not \$3,000.00 or more, the operator proceeds in the usual manner, as has been previously described, to make the proper deductions for OAB and the rest of the deductions, and finally sets up the net pay.

However, should the employee's earnings to date amount to \$3,000.00 or more, then, when this amount is picked up, the \$1,000.00 differential will go to the 3 position and cause the previously-described switch 152 to be closed. When the earnings-to-date is picked up, the "X Earnings to Date" key 65 is depressed, and, when this key is depressed, it closes a switch 330. If the employee's earnings to date was \$3,000.00 or more, a circuit is completed from battery 331 through switch 152, through a normally closed switch 332, over line 333, and through the closed switch 330 to point 334. From this point, the circuit continues on and energizes a relay 335. The energization of the relay 335 attracts two armatures 336 and 337. The drawing in of the armature 337 completes the holding circuit for the relay 335, which is as follows: from point 334 through armature 337, line 338, to point 319 in the power line.

At the same time, a circuit is completed from point 334 over line 339, through a solenoid 340 to the ground. The operation of this solenoid by the above circuit when the amount of the earnings-to-date is \$3,000.00 or more on the pickup operation causes the "FOAB" key 67 to be locked, so that the operator cannot deduct any OAB from the gross pay which is to be recorded for this particular employee because of the fact that his earnings to date have already reached \$3,000.00.

When the armature switch 336 is pulled up by the relay 335, the circuit to the lamp 161 is opened, thus preventing this lamp from being lighted at any time during any subsequent operations necessary to complete a payroll check.

The operator will therefore proceed to make all other necessary deductions for this particular employee and finally set up the net pay and depress the Net Pay key 66.

Depression of this key 66, which is the final operation in the issuing of an employee's pay-

roll check, causes, as has been previously described, the employee's clock card and pattern card to be ejected, so that the next employee's cards will be at the front of the respective stacks, ready for the operator to write the check associated with this next employee.

Upon depression of the "Net Pay" key 66, a circuit is completed to cause a clock card motor 341 to operate and also a pattern card motor 342 to operate.

Depression of the "Net Pay" key 66 completes the following circuit: from battery 343 through switch 344 to point 345, over line 346 to a relay 347, and thence to the ground. This causes energization of this relay 347, thus operating a latch 348 to release a lever 349, whereupon a spring 350 moves an arm 351 to the left and closes a switch 352, thus completing the circuit from the line 346 through the switch 352 and line 353 to the clock card motor 341, as fully described in the Spurlino et al. Patent No. 2,467,704.

Simultaneously with the completion of this last-described circuit, a circuit is completed from point 345 over line 355 to a relay 356 to the ground. This energizes the relay 356, whereupon its armature releases a latch 357 from a lever 358, whereupon a spring 359 causes an arm 360 to close a switch 361, thus completing a circuit from the line 355 through the switch 361, and a line 362 to the pattern card motor 342.

Thus both motors 341 and 342 operate to drive mechanism, previously mentioned, to eject the front clock card and the front pattern card.

At 363 is shown the usual register motor having in circuit therewith a normally open switch 364, which is closed by depression of any one of the operating keys on the machine, fully illustrated and described in the former patents mentioned, particularly the Spurlino et al. Patent No. 2,467,704. When this switch 364 is closed, the register circuit is completed from a battery 365 through an armature switch 366, line 367, switch 364 to the register motor 363 to operate the machine.

When the Net Pay key 66 is depressed, the following circuit is also completed: from the point 345 through a line 368 and armature switch 369 to a relay 370 and thence to the ground. This circuit energizes the relay, which pulls up both the armature switches 366 and 369, thus establishing one circuit from the battery 365 through the armature switch 366, line 371, and lamp 372 to the ground, thus lighting this lamp, which is the card clearing signal lamp. A holding circuit for the relay 370 is created from the power point 319, through line 373 to the relay 370, and thence to the ground.

As has been previously stated, the operation of the Net Pay key 66 is the final operation of the machine and operates the motors 341 and 342 for the clock card and the pattern card, to eject these cards in the manner illustrated and described in the above-mentioned Spurlino et al. Patent No. 2,467,704. When these cards are ejected, they break the circuits by causing the switches 311 and 312, respectively, to open, thus breaking the holding circuit through line 373 to the relay 370, whereupon the armature switches 366 and 369 are released, thus breaking the circuit to the lamp 372 and causing the lamp to go out, and at the same time reestablishing the circuit from battery 365, switch 366, and line 367 to the motor 363, so that, upon the next operation of the machine, when an operating key is depressed to

close the switch 364, this circuit to the motor 363 may be completed. At the same time, release of the armature switch 369 reestablishes the circuit back to the Net Pay key 66 when this key is depressed. From the above description it can be seen that it is necessary that both cards—that is, the clock card and the pattern card—be ejected simultaneously in order to reestablish the motor circuit and the Net Pay key circuit for any subsequent operation. Should one of the cards fail to eject, then the switch 311, if it is the clock card, or the switch 312, if it is the pattern card, would not be opened; consequently the holding circuit 373 for the relay 370 would not be broken, and the light 372 would remain lighted, thus indicating to the operator that one of the cards, either the clock card or the pattern card, had not ejected from its respective box at the end of the operation of the Net Pay key.

When the holding circuit 373 for the relay 370 is not broken, due to the failure of either card to eject, the circuit to the motor 363 is held open, thus preventing any subsequent operations of the machine until the operator manually opens the switch 313 momentarily, which will release the holding circuit for the relay 370 and all other relays.

Also when both switches 311 and 312 are simultaneously opened, the holding circuits for all relays are opened; thus all of said relays are de-energized.

If during an operation of the machine, when the employee's gross pay is added into the machine, which gross pay added to the earnings-to-date which was picked up, reaches \$3000 or more, upon the extension of the balance during this operation, which is created by the depression of the "Balance Extension" key 63, this key operates the switch 332 to break the circuit to line 333 and close a circuit from the battery 331, switch 152, through the operated switch 332, line 375, armature switch 336, line 376, to the lamp 161 and thence to the ground, thus lighting up this lamp 161 which, as previously described, is a red light, which indicates to the operator that during the operation of the machine, when the employee's gross pay was entered and added to the balance or earnings-to-date which had been previously picked up, made \$3000 or more, the operator would be apprised of this fact, due to the fact that the red light 161 had been lighted.

It then becomes necessary for her to read the amount from the total indicating wheels, as has been earlier described, so that she can make the proper calculations to deduct a lesser amount of OAB than would be required from the employee's full pay for that particular week.

A circuit which is completed when an employee worked, for example, 33 hours instead of 34 hours will now be described. During this operation, the wipers 282 will move to the 3 position, and the left-hand wiper will contact the terminals 276 opposite the 3 position. However, the right-hand wiper 282 will not contact any terminals because there are none in the 3 position. Therefore, during this operation there will be no lamp 193 lighted, and the operator knows that she will have to depress the "Spec. Key No. 3" in order to get the proper lamp lighted on the chart for this purpose. This lamp will not light because there will be no circuit completed through the right-hand wiper 282 and the line 302, and therefore, upon depression of the "Spec. Key No. 3" 65, a switch 380 is closed, thus completing the circuit from a battery 381 through the closed switch 380,

line 382, through a relay 383, and thence to the ground. This causes energization of the relay, which pulls up armature switches 384 and 385, thus creating a circuit from a point 386 on the power line 388 over line 387, switch 385, line 384 to point 388, and thence over line 302 to the bar 277, through the terminals 276, by means of the left-hand wiper 282, over line 389, to the solenoid 224, which will cause the face 185 of the pattern card box to drop down one step to select the line opposite the 32-hour figure.

A circuit is also completed from the power line point 386, over line 387, switch 385, and line 305 to the bar 272 and thence over the left-hand wiper 275 in the 3 position, over line 306 to energize the relay 307 to complete the circuit to the 30-hour group lamp 193, as previously described, to light up the selected 32-hour line.

However, since it is 33 hours that is being considered, the operator does not read the 32-hour line, because the extra pay for the one hour must be computed from the chart exposed below the edge 191 of the face 185. Therefore, the lamp 193 for this chart must be lighted.

The energization of the relay 383 also created the following circuit: from the power line point 386 over line 387, armature switch 384, line 390, to the lamp 193 associated with the special group of computation figures on the pattern card below the 39 and tenths hours group of lines, so that the operator may compute the amount of money for one hour from this group of figures and add it to the amount which is shown opposite the 32-hour group, and at the same time she may compute also all of the deductions and the net pays from this special group of figures.

A holding circuit for the relay 383 is created from the power point 386, line 387, armature switch 384, line 390, over lines 391 and 382, and thence back through the relay 383 to the ground.

The above circuit for any odd number of hours such as 11, 13, 15, 17 or 21, 23, 33, 35, or 37, etc., will be completed through the operation of the "Spec. Key No. 3" to establish the last-mentioned circuit through the relay 383, in order to light the proper lamp in connection with the pattern card.

The circuits will now be described where an employee works, for example, 39.9 hours. When this occurs, the tens hours differential will go to the 3 position, and consequently the right-hand wiper 275 will be moved to the 3 position, thus creating a circuit as follows: from a battery 400 through the contacts 273 by means of the right-hand wiper 275, over bar 274, line 401 to the right-hand one of the pair of contacts 280. The wipers 282 have been moved to the 9 position, due to the fact that the 9 units of hours key was depressed. The circuit is continued over the right-hand wiper 282 to the left-hand terminal 280, bar 281, line 402, bar 288. Since the tenths of hours was .9, the wiper 292 has moved into the 9 position, and the circuit is therefore continued over the left-hand wiper 292, over the bar 293 to the bar 286, over line 403 to a relay 404 and thence to the ground, thus causing energization of this relay, which pulls up its armature 405, whereupon a circuit is completed from the power point 319, line 320, line 406, armature 405, and line 407 to the lamp 193, and thence to the ground, thus lighting up this lamp, which is associated with the 39.5 to 39.9 hours lines on the pattern card 171.

Since the 39.9 position is comparable to the 10, 20, 30, and 40-hour positions on the card, the

line opposite 39.9 hours is read just below the edge 191 of the pattern card face 185, since none of the solenoids 224, 232, 236, or 242 are energized during this operation, as there is no connection to any of them from the .9 hour positions, as shown on the wiring diagram.

Should the number of hours have been, for example, 39.8, then a circuit would have been completed from the bar 288 over the wiper 292, over bar 293 through the contact terminals 285 in the .8 position, and thence over line 408 to the solenoid 230, thus causing the pattern card face 185 to drop one space to position the upper part of the opening 191 opposite the line of hours designated by 38.8.

In case the operator should come across a pattern card and the clock card of some employee who did not work that week, then, to get these two cards out of their respective boxes, all that the operator does is to press a skip button 409, which moves a switch 410 to complete a circuit as follows: from the battery 411 through the switch 410, a line 412, to point 345, and from here through the line 346 to energize the relay 347 and cause operation of the clock card motor 341, as previously described, and also from the point 345 through line 355 to energize the relay 356 to cause operation of the pattern card motor 342 in the manner previously described. Thus both the clock card and the pattern card of the same employee will be ejected from their respective boxes upon the depression of the skip button 409 when such employee did not work the particular week for which the operator is making up the payroll.

If the hours are 34.1, the wipers 292 are above the 0 bars 290 and 291; thus the lamp 193 will not light, and the face 185 will not be positioned. Therefore the operator must press the "Spec. Key No. 3" to complete for lamps 193 and solenoids 230, as previously described. In other words, any time the hours worked are in tenths, except 39.5 to 39.9, the operator must operate the "Spec. Key No. 3" to complete the proper circuits to light the lamps 193 and energize the desired solenoid 224, 230, 236, or 242.

Whenever the lamp 161 is lighted, indicating that the earnings to date reached or exceeded \$3,000.00 on the balance extension, a solenoid 413 is operated over circuit line 376, to print a symbol on the journal or audit sheet to apprise the auditor of such fact.

Modified form

In Figs. 11, 12, and 13 are shown the use of a modified form of a pattern card box and the means for selecting the lines on the pattern card.

This pattern card box is shown for the selection of 16 lines wherein each line is covered by a shutter, which is lifted to expose the line to be used by the operator in computing the employee's net pay. This box is designated 421 and has secured thereto a channel 422 adapted to fit over a T-shaped bar on the back of the cabinet 135. This bar is not shown in connection with this modified form but is identical with the bar 181, as shown in Fig. 9 in connection with the preferred form.

The front of the box 421 has an opening 422, the upper part of which is not covered in order that the employee's name, check number, and rate may be visible through this part of the opening. However, below this there are 16 shutters 423 secured to rods 424. These rods 424 are all pivotally mounted in a pair of bars 425 se-

cured to the front of the box 421. One end of each of the rods 424 is formed in a loop 426. The top rod 424 has its loop 426 on the left end, as viewed in Fig. 11. The second rod has its loop 426 on the right end. The third, fifth, seventh, ninth, eleventh, thirteenth, and fifteenth rods have their loops 426 on their left ends, and the fourth, sixth, eighth, tenth, twelfth, fourteenth, and sixteenth rods have their loops on the right-hand ends, as clearly shown in Fig. 11. Around each rod is a torsion spring 427, tending to turn the rod and its shutter 423, which is secured thereto, so that the bottom edge of the shutter will be turned inwardly a distance sufficient to expose the line of printing on the pattern card beneath such shutter.

The second, fourth, sixth, eighth, tenth, twelfth, fourteenth, and sixteenth rods 424 are prevented from turning counter-clockwise, as viewed in Fig. 12, by means of stop levers 428, pivoted to core stems 429 of solenoids 430. In Fig. 13 are shown the loops 426 on the third and fifth rods in cooperation with their associated stop levers 428, which prevent said rods from turning clockwise, as viewed in Fig. 13. These stop levers 428 are each pivoted to a core stem 429 of solenoids, not shown but identical with the solenoids 430 that are associated with the core stems 429 shown in Fig. 12.

When, for example, the top solenoid 430 (Fig. 12) is energized, it lifts its core stem 429, thus rocking the stop lever 428 counter-clockwise, whereupon it is moved from engagement with the loop 426 of the second rod 424, and its spring 424 rocks said rod counter-clockwise as viewed in Fig. 12, thus permitting inward movement of its attached shutter 423 under the action of its spring 427 to expose the second line on the pattern card to the view of the operator.

These solenoids, there being sixteen in number, one for each of the shutters 423, are operated under the control of hours keys in substantially the same manner as has been described in connection with the preferred form. That is to say, circuits are completed upon the depression of hour keys corresponding to the sixteen lines which represent sixteen different hours so as to energize the respective or associated solenoid 430, so that the particular line will be exposed to view, corresponding to the hours key which is depressed.

Whenever any of the shutters 423 attached to the second, fourth, sixth, eighth, etc., rods 424, shown in Fig. 13, are moved clockwise under the control of their associated springs 424, after having been released by their associated solenoids 430, the loop 426 is moved into the position shown in dotted lines in Fig. 13, wherein said loop engages the upper part of a notch 435 in a restoring bar 436. There is a notch 435 associated with each of the loops 426 which extend to the right, as viewed in Fig. 11.

Whenever any of the shutters 423 associated with the rods 424, which have their loops projecting on the left-hand side of the box 421, as shown in Figs. 11 and 12, the loop will contact the under side of a notch 437 in a restoring bar 438. There is a notch 437 associated with each of the loops 426 which extend out to the left, as viewed in Fig. 11.

These bars 436 and 437 are slidably mounted by means of studs 440, which project through slot 441 in said bars. Only one of said slots is shown, and that is in Fig. 12. The bars 436 and 438 are normally urged upwardly by springs

442, one of which is connected to each of the bars. The bar 438 has a notch 443, into which projects a bar 444 pivoted on a stud 445 carried by the front of the pattern card box 421. Pivoted on a stud 447 is a bar 446, which projects into a notch 448 in the bar 436. These two bars 444 and 446 are pivoted together by a stud 449.

Near the end of the operation of the machine, wherein the Net Pay key 66 is depressed, the bars 436 and 438 move downwardly, thus, through the medium of their notches 435 and 437, restoring to normal position any of the shutters 443 which have been operated during the operation of the machine for writing the payroll check of any employee. In other words, the notch 435 or 437, as the case may be, by its engagement with the loop 426, merely rocks the rod 424 from the dotted line position, shown in Fig. 13, back to the normal position.

The means for moving the bars 436 and 438 downwardly to restore any operated shutter 423 will now be described.

Projecting through a slot 455 in the front of the pattern card box 421 is a stud 456 carried by a bar 457. A spring 458 normally holds the pin 456 in the top of the slot 455. This bar 457 is connected to a crank 459, which is similar to the crank 254 (Fig. 9) and is caused to move downwardly and then back to its normal position, shown in Fig. 12, near the end of the operation wherein the Net Check or Net Pay key 66 has been depressed. During the downward movement of the crank 459, the pin 456 is moved downwardly and engages a slot 460 in the bar 446, thus rocking this bar counter-clockwise about its pivot stud 447 and, through the stud 449, rocking the bar 444 about its pivot stud 445 in a clockwise direction. The counter-clockwise movement of the bar 446 and the clockwise movement of the bar 445, through their engagement with the notches 443 and 448 of the bars 438 and 436, respectively, move said bars downwardly to cause their notches 437 and 435, respectively, to rock back to normal position any of the shutters 423 which have been operated. As the crank 459 is moved upwardly to its normal position, the springs 442, which had been put under tension by the downward movement of the bars 436 and 438, restore said bars upwardly to their normal positions, thus rocking the bars 444 and 446 back to their normal positions, as shown in Fig. 11.

While there are only sixteen shutters shown in Fig. 11, it is to be understood that any number of shutters may be used, depending upon the number of lines in the particular type of pattern card which is used in connection with this pattern card box.

Second modified form

The second modified form is shown in Fig. 14 only and consists of a pattern card box having a channel bar 466 secured thereto which is to slide over a T bar similar to the T bar 181, which is shown in Fig. 9 and which is secured to the cabinet of the machine. This pattern card box 465 is provided with an adjustable or movable face 467, which is operated and controlled in substantially the same manner as the face 185 (Fig. 6) of the pattern card box 180, previously described as the preferred form. This face 467 is provided with six slots or openings 468, only one of which is shown, and a larger opening 469, so that the various lines on a pattern card similar to the pattern card 171, shown in Fig. 2, may be

used in connection with this particular pattern card box. Associated with each of the slots 468 and normally covering the same is a hinged lid 470, which has associated therewith a torsion spring 471, normally tending to raise the lid to uncover its associated slot 468. The hinged lid 470 is normally held in closed position against the influence of the spring 471 by a flange 472 of a lever 473 pivoted on a stud 474 carried by the face 467. A spring 475 normally holds the lever 473 in the position shown, wherein the flange is against the bottom edge of the lid 470.

Associated with each of the levers 473 is a solenoid 476, which is under control of the keys in the tens of hours banks and is controlled in substantially the same manner as are the solenoids 224, 230, 236, and 242, described in connection with the preferred form. Whenever one of the solenoids 476 is energized, it attracts the left end of the lever 473; that is, it pulls the left end of the lever upwardly, as viewed in Fig. 14, rocking the lever 473 clockwise and releasing the flange 472 from the bottom of the hinged lid 470, whereupon its spring 471 rocks said lid outwardly so as to expose the slot 468 beneath the same and the line of figures which has been selected by the movement of the face 467, as has been earlier described in connection with the preferred form.

Near the end of the Net Pay operation—that is, the operation which is initiated by depression of the Net Pay key—the operated lid 471 is restored to its normal position by the following means:

Slidably mounted on the face 467 is a restoring bar 477. This bar has slots 478 cooperating with studs 479 secured to the face 467 and upon which said bar 477 slides. This bar 477 is provided with a series of bent-over flanges 480, there being one associated with each of the lids 470. Normally the bar 477 is in the position shown, wherein the flanges 480 are above the hinges of the lids 470, so that the lids 470 may rock to a substantial horizontal position under the influence of their springs 471 when they are selected by their associated solenoids 476.

Near the end of the operation, the restoring bar 477 is moved downwardly, and in such downward movement the flanges 480 engage their associated operated lids 470 and restore them to their normal positions. The bar 477 is then moved upwardly to the position shown in Fig. 14.

The means for moving this bar 477 downwardly to restore the lids 470, and then back up to its normal position, is substantially the same as that shown in connection with the preferred form, which moves the face 185 to its normal position. In other words, a crank similar to the crank 254 of Fig. 9 is used to pull down the bar 477 as said crank is moved downwardly, and when the crank is moved upwardly it is used to restore the bar 477 to its upper position and at the same time restore the face 467 from any of the downward positions of adjustment into which it has been moved.

While the form of mechanism herein shown and described is admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the particular forms or embodiments herein disclosed, for it is susceptible of embodiment in other forms.

What is claimed is:

1. In a machine of the class described, the combination of a plurality of manipulative devices; a card having thereon columns of figures representing numbers of hours, gross pay, fixed deductions, and columns of net pays, according

to the fixed deductions and special deductions, the gross pays and the net pays being arranged in lines according to the numbers of hours worked; a card holder to hold a plurality of such cards; a movable face for said holder, said face comprising a single member having a plurality of parallel horizontal openings normally exposing a certain complete horizontal line of groups of lines of figures on said card; means controlled by said manipulative devices for selecting other groups of lines for exposure through said openings; a plurality of normally ineffective illuminating means, one mounted on the movable face adjacent each of said openings; and means under control of said devices for rendering effective the illuminating means associated with one of the groups of lines to illuminate the selected line of said one group to render said line clearly readable through the opening associated with said group of lines.

2. In a machine of the class described, the combination of a plurality of manipulative devices; a card having thereon columns of figures representing numbers of hours, gross pay, fixed deductions, and columns of net pays according to the fixed deductions and special deductions, the gross pays and net pays being arranged in lines according to the number of hours worked; a card holder to hold a plurality of such cards; a movable face for said holder, said face having a plurality of openings normally exposing a certain line of groups of lines of figures on said card; means controlled by said manipulative devices for selecting other groups of lines for exposure through said openings; a plurality of normally ineffective illuminating means carried by said movable face; and means under control of said devices to cause illumination of one of said illuminating means, depending upon which of said devices are operated to control the selection of said other groups of lines.

3. In a machine of the class described, the combination of a plurality of manipulative devices; a card having thereon columns of figures representing numbers of hours, gross pay, fixed deductions, and columns of net pays according to the fixed deductions and special deductions, the gross pays and net pays being arranged in lines according to the number of hours worked; a card holder to hold a plurality of such cards; a movable face for said holder, said face consisting of a single member having a plurality of horizontal openings normally exposing a certain line of groups of lines of figures on said card; electric means under control of said manipulative devices to cause adjustment of said face to select various lines on said card for exposure through said openings; a plurality of electric lamps; a plurality of housings for said lamps carried by said movable face; and electric means controlled by said devices to cause one of said lamps to be lighted, depending on the line selected for exposure.

4. In a machine of the class described, the combination of a plurality of manipulative devices representing the numbers of hours; a plurality of manipulative devices representing amounts; a card having thereon a column of figures representing hours, and a group of precalculated figures arranged in lines opposite said hours figures and representing gross pay, deductions, and various net pay amounts, based on the number of hours associated therewith; a card holder to hold a plurality of such cards; an adjustable face on said card holder, said face con-

sisting of a single slidable member having a plurality of horizontal openings normally exposing a certain group of lines of figures; and means including differentially adjustable mechanism under control of the devices, representing numbers of hours, for causing adjustment of said card holder face to select other groups of lines for exposure of the entire lines through said horizontal openings.

5. In a machine of the class described, the combination of a plurality of manipulative devices representing numbers of hours; a plurality of manipulative devices representing amounts; a card having thereon a column of figures representing hours, and a group of precalculated figures arranged in lines opposite said hours figures and representing gross pay, deductions, and various net pay amounts based on the deductions and the number of hours associated therewith; a card holder to hold a plurality of such cards; an adjustable face on said card holder, said face being a single member having a plurality of horizontal openings normally exposing the entire lines a certain group of lines of figures; means under control of the devices representing the number of hours, for causing adjustment of said card holder single face member to select other groups of lines for exposure of the entire lines through said openings; and means for lighting up one line of each selected group of lines under control of the operated devices representing numbers of hours.

6. In a machine of the class described, the combination of a plurality of manipulative devices representing numbers of hours; a plurality of manipulative devices representing amounts; a card having thereon a column of figures representing hours, and a group of precalculated figures arranged in lines opposite said hours figures and representing gross pay, deductions, and various net pay amounts based on the deductions and the number of hours associated therewith; a card holder to hold a plurality of such cards; an adjustable face on said card holder, said face having a plurality of openings normally exposing a certain group of lines of figures; electromagnetic means carried by said card holder and controlled by the hours devices for causing adjustment of the card holder face to select other groups of lines; and electrical means under control of the operated devices to light up a certain one of the lines of a selected group of lines.

7. In a machine of the class described, the combination of a plurality of manipulative devices representing units of hours; a plurality of manipulative devices representing tens of hours; a card having thereon a column of figures representing numbers of hours and other precalculated data representing gross and net pays arranged in lines opposite their associated hours; a card holder to hold a plurality of such cards; an adjustable face on said card holder, said face having a plurality of openings normally exposing a certain line of groups of lines on said card; electromagnetic means controlled by the units of hours devices for causing adjustment of said face to select other groups of lines of figures for exposure through said openings; and electrical circuits controlled by the tens of hours devices for selectively illuminating one line of the selected group of lines.

8. In a machine of the class described, the combination of a card holder; an adjustable face for said card holder; means to slidably support said face; a pair of arms connected to said face;

a member connected to said arms; a plurality of latches cooperating with said member, one of said latches normally engaging said member to retain the face in normal position; and a plurality of electromagnetic means to control said latches to release said one latch from said member to cause it to engage another latch to cause adjustment of said face to another position.

9. In a machine of the class described, the combination of a card holder; an adjustable face for said holder; means to slidably support said face; a pair of arms connected to said face; a member connected to said arms; a plurality of latches cooperating with said member, one of said latches normally engaging said member to retain the face in normal position; a plurality of electromagnetic means to control said latches to release said one latch from said member and to cause it to engage another latch to cause adjustment of said face to another position; and a plurality of manipulative devices to determine which of said electromagnetic means is to effect said control of the latches.

10. In a machine of the class described, the combination of a card holder; an adjustable face for said holder; a pair of arms connected to said face; a member connected to said arms; a plurality of latches cooperating with said member, one of said latches normally engaging said member to retain the face in normal position; a plurality of electromagnetic means to control said latches to release said one latch from said member and cause it to engage another latch to cause adjustment of said face to another position; and means connected to said arms to restore said face to normal position.

11. In a machine of the class described, the combination of a card holder; an adjustable face for said card holder; means to slidably support said face; a pair of arms connected to said face; a member connected to said arms; a plurality of latches cooperating with said member; and a plurality of selectively operable electromagnetic means connected to said latches to selectively operate the latches to cause selective adjustment of said face.

12. In a machine capable of single and multiple operations involved in a complete transaction, a plurality of banks of amount keys; a differential mechanism controlled by each bank of keys; a plurality of banks of control keys; certain of which control the machine to make one-cycle operations and certain others control the machine to make multiple-cycle operations; a normally ineffective electric lamp; a normally open switch associated with the differential

mechanism for one of the amount banks of keys; a spring-pressed member adapted to close said switch to cause said lamp to be lighted when said last-mentioned differential mechanism reaches a certain position in its movement; and means actuated by said last-mentioned differential mechanism to prevent the spring-pressed member from closing said switch until said certain position is attained by said differential mechanism.

13. In a machine capable of single and multiple cycle operations involved in a complete transaction and adapted for payroll recording in connection with an employee's earnings to date, gross pay, OAB, and other deductions and net pays, a plurality of control keys, certain of which control the machine to make one-cycle operations and certain others control the machine to make multiple-cycle operations; a plurality of banks of amount keys adapted to control the entry of earnings to date amounts, gross pay amounts, OAB, and other deductions, and also net pay amounts in the different one-cycle operations; totalizers to record such amounts entered; a differential means controlled by each bank of amount keys in one-cycle operations, and by said totalizers in multiple-cycle operations; and electrical means including a normally open switch, a member to close the switch, a pin to control the member, said pin being operable, under control of certain differential means and its associated totalizer wheel during a multiple-cycle operation in which the total of an employee's earnings to date plus his gross pay exceeds a certain amount, to cause said member to close said switch to signal the operator that said certain amount has been exceeded.

References Cited in the file of this patent
UNITED STATES PATENTS

Number	Name	Date
987,186	Stillwell	Mar. 21, 1911
1,004,881	Kettering	Oct. 3, 1911
1,163,748	Fuller	Dec. 14, 1915
1,672,533	Jurs	June 5, 1928
1,911,863	Webner	May 30, 1933
2,137,845	Klaar	Nov. 22, 1938
2,288,520	Geller et al.	June 30, 1942
2,362,709	Mehan	Nov. 14, 1944
2,416,598	Spurlino et al.	Feb. 25, 1947
2,467,704	Spurlino et al.	Apr. 19, 1949

FOREIGN PATENTS

Number	Country	Date
270,044	Great Britain	May 6, 1927