MACHINE METHODS OF ACCOUNTING

NUMERICAL INTERPRETERS

THE increased variety of accounting routines to which the tabulating card principle was adopted included some procedures which necessitated the creation of unit records to which it frequently was necessary to refer directly. Consequently, a demand arose for transferring the data recorded in the form of punched holes into more readable form. To meet this need, machines were developed which print or "interpret" on the card itself the symbols corresponding to the punched data.

These machines gave impetus to the use of the tabulating principle in those accounting routines in which the unit card records were to constitute permanent files to which reference was frequently made (thereby necessitating the "interpretation" of punched reference information), as well as to the preparation of various documentary records such as tabulating card checks. The following illustrations show representative examples of the interpretation of cards for each of these purposes.

Accounts Receivable Subsidiary Ledger Cards

Card Check

The Automatic Interpreter (Type 550)

The Automatic Interpreter (Type 550) is used to translate the holes punched in a tabulating card into printed figures along the top edge of the card. The information to be printed may be placed in any sequence. This is made possible by a plugboard which provides entire flexibility. Forty-five columns of interpreted data constitute the full printing capacity of the machine, but any 45 columns of a card may be selected.

The operation of this machine is very simple, the only requirement on the operator's part being to place the group of cards to be interpreted in the feeding unit, wire the plugboard, set the zero suppression levers, and press the start button. The machine then automatically interprets at the rate of 75 cards a minute or 4,500 cards an hour.

Automatic interpretation of punched cards is an aid to checking, filing, selection, and reference operations.
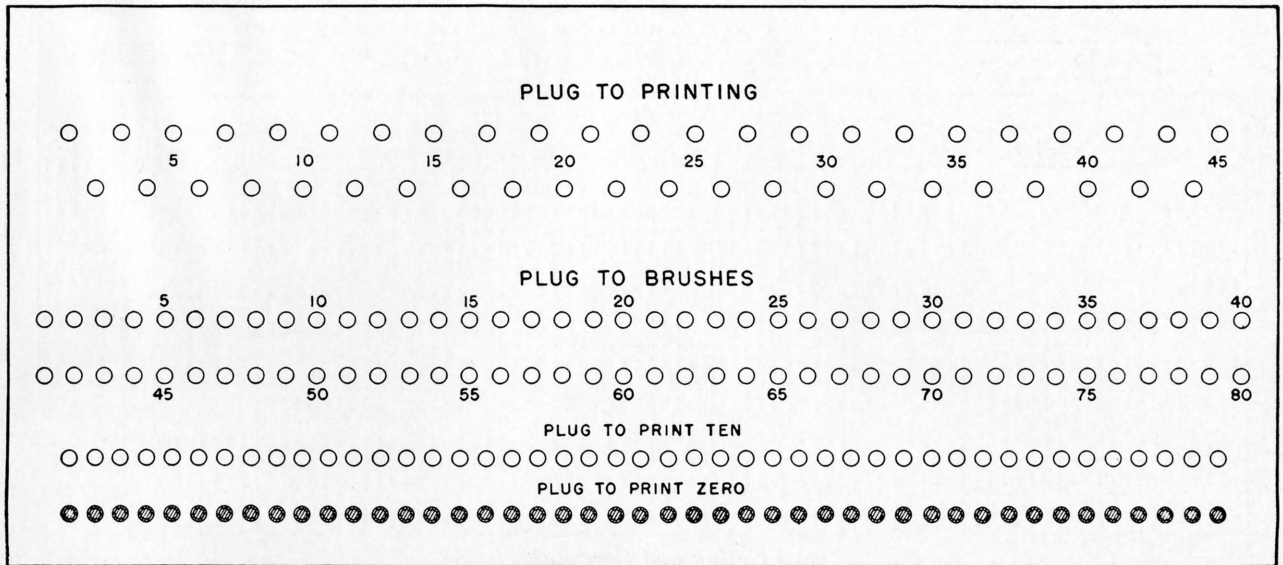
Card Feeding

The machine is equipped with a horizontal feed which permits continuous operation when cards are being placed in the feed hopper or removed from the stacker. Cards should be placed in the hopper printed side down with the top edge (12's) entering the machine first.

The feeding hopper has a capacity of 800 cards; and the stacker, in which the interpreted cards are deposited, has a capacity of 1,000 cards.

Plugboard

There are two sets of hubs for the insertion of connection wires on this machine. One set corresponds to the columns of the card (brush positions) and the other set corresponds to the forty-five type bars (printing positions). These two sets of hubs make it possible to record across the top of the card, in any desired sequence, the information recorded in any forty-five columns of the card.

PLUG TO PRINTING

5   10   15   20   25   30   35   40   45

PLUG TO BRUSHES

5   10   15   20   25   30   35   40

45   50   55   60   65   70   75   80

PLUG TO PRINT TEN

PLUG TO PRINT ZERO
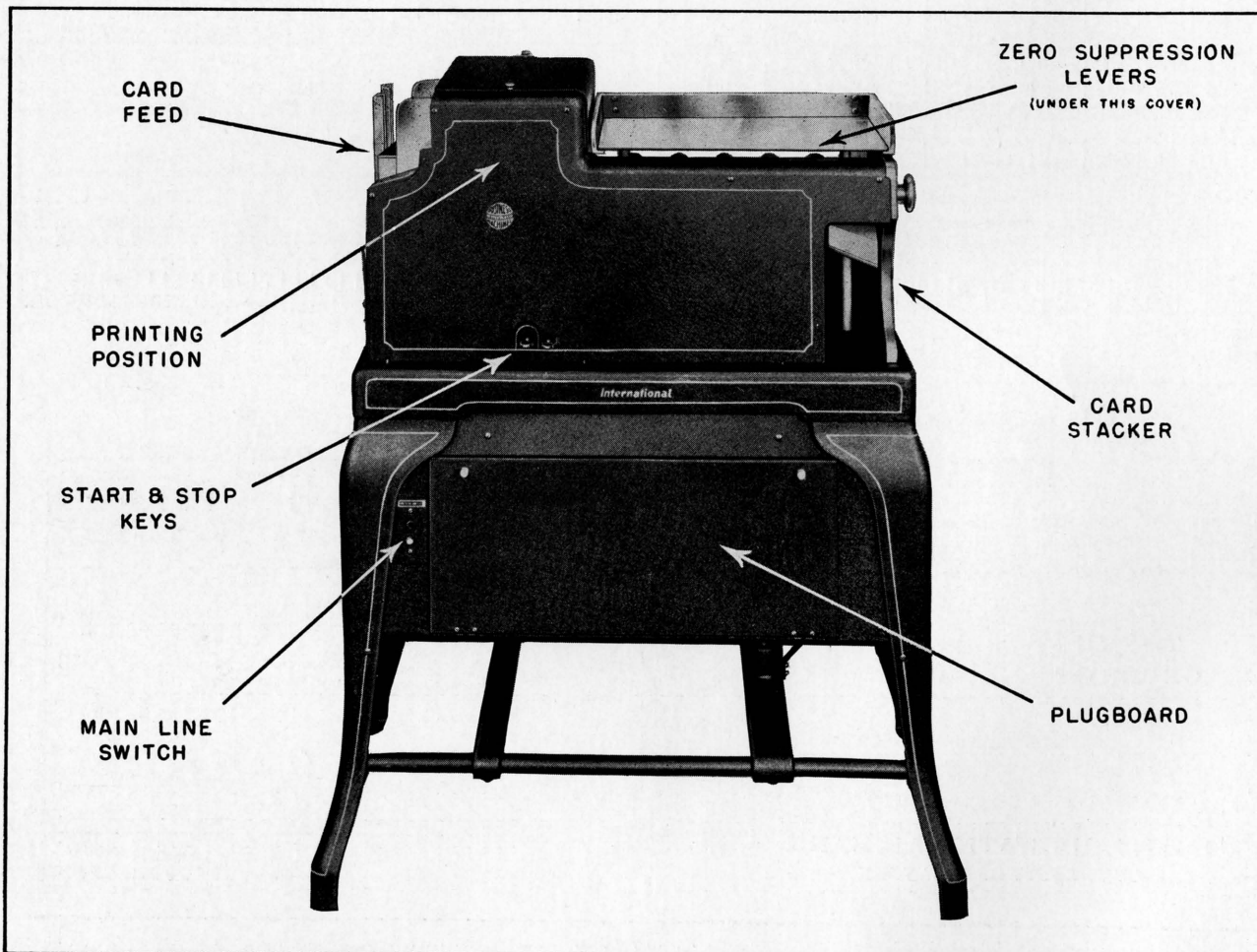
Plugboard of the Automatic Interpreter

At the bottom of the plugboard are two additional rows of hubs which are utilized for printing "10" or "0". These hubs are fitted with a special set of plugs which are normally inserted in the lower hubs (Print Zero) to cause the machine to interpret punched zeros in the normal manner. When any of the plugs are placed in the upper of these two rows of hubs (Print Ten) the machine interprets punched zeros appearing in the corresponding columns as 10's.

When the eleventh and twelfth positions at the top of the card are punched, they can be interpreted only by moving the plug to the Print Ten row of hubs. When double punching, such as "X" and "5", appears the "5" will be interpreted if the plug is set to Print Zero.

When plug wires are inserted to connect certain specified card columns with the desired printing positions, the machine will print not only the figures contained in those columns of the card which have been wired, but also a series of zeros to the right of the number unless controlled otherwise.
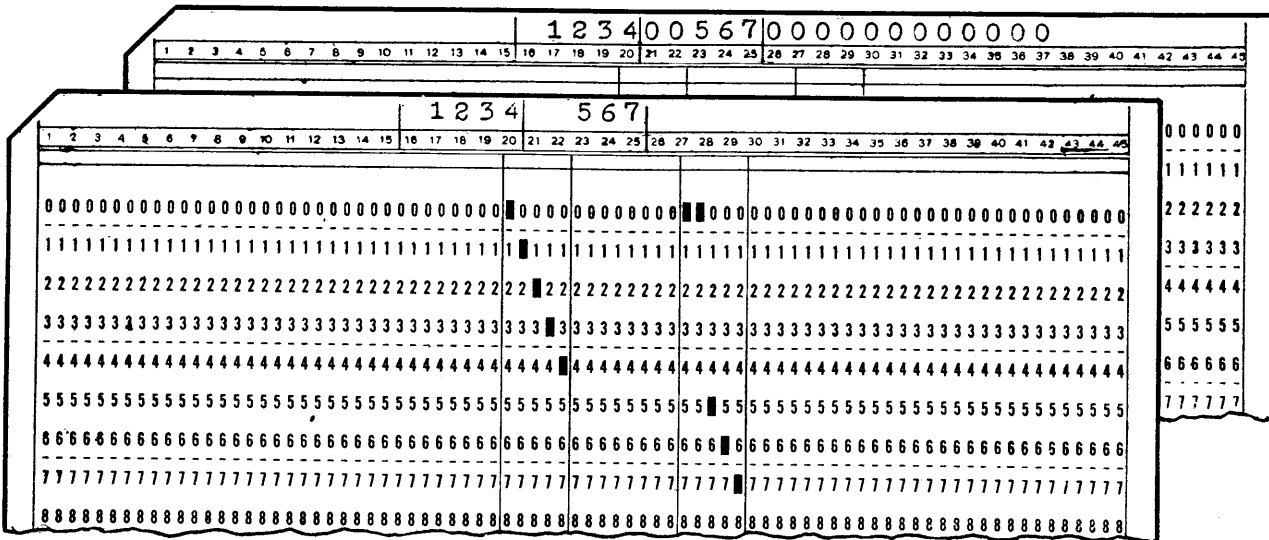
Zero Suppression

The printing unit of the Automatic Interpreter is composed of a single continuous bank of forty-five type bars. Since it is necessary to divide the printing into columnar fields, a device has been provided for preventing the printing of zeros to the right of interpreted amounts.

Next to the feed mechanism and under the glass cover is a series of 45 short levers and a columnar indicating strip corresponding to the
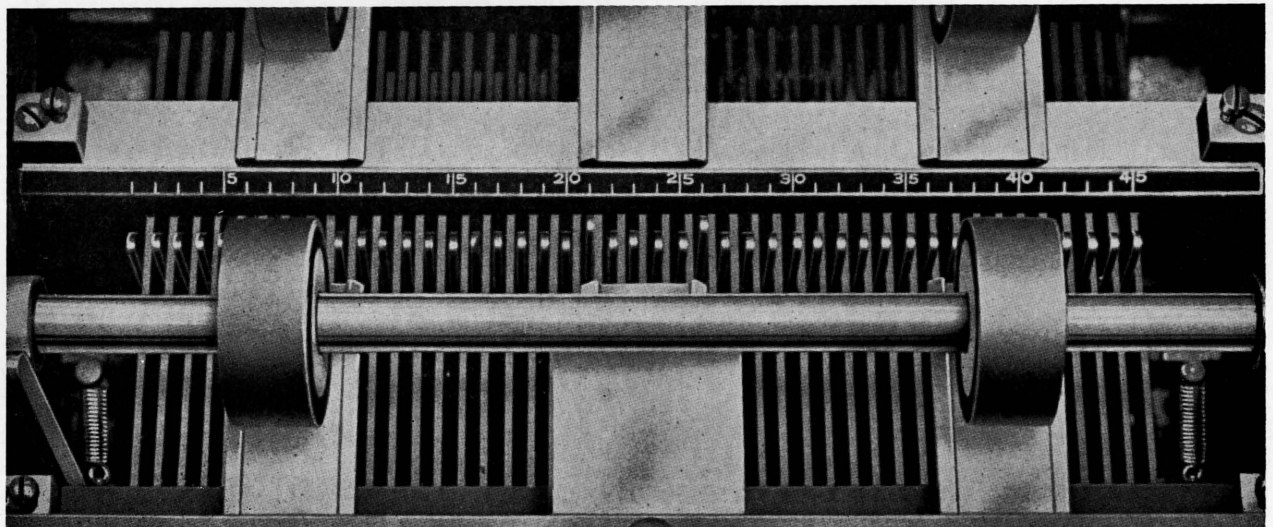
Zero Suppression Levers

Zero Printing and Zero Suppression

forty-five positions. These short levers are normally locked in the position to which they have been set by a mechanism controlled by either of the two long levers situated on the back and front rails.

If it is desired to print in two fields on a card —from position 15 to position 20, and from position 21 to position 25, inclusive—the locking mechanism should be set as follows: Press either of the long levers toward the stacker and then move the short levers in columns 21 and 26 toward the feed mechanism. All the short levers intervening should be away from the feed mechanism. The setting of the 21st lever prevents the printing of zeros immediately preceding any number, having less than five digits, which may be interpreted in the second field.

Likewise, the setting of the 26th lever prevents the printing of zeros after the second field or before any field to its right, which may be interpreted also.

Electrical Zeros

When it is desired to print zeros in a given position, regardless of whether or not a significant digit appears to the left, the printing may be accomplished by substituting a 0 for the 10 type character and placing the plug in the Print Ten hub.

Electrical Energy

The Automatic Interpreter operates on direct current—110 or 220 volts, and consumes 5.0 amperes for starting and 2.5 amperes for running at 110 volts.
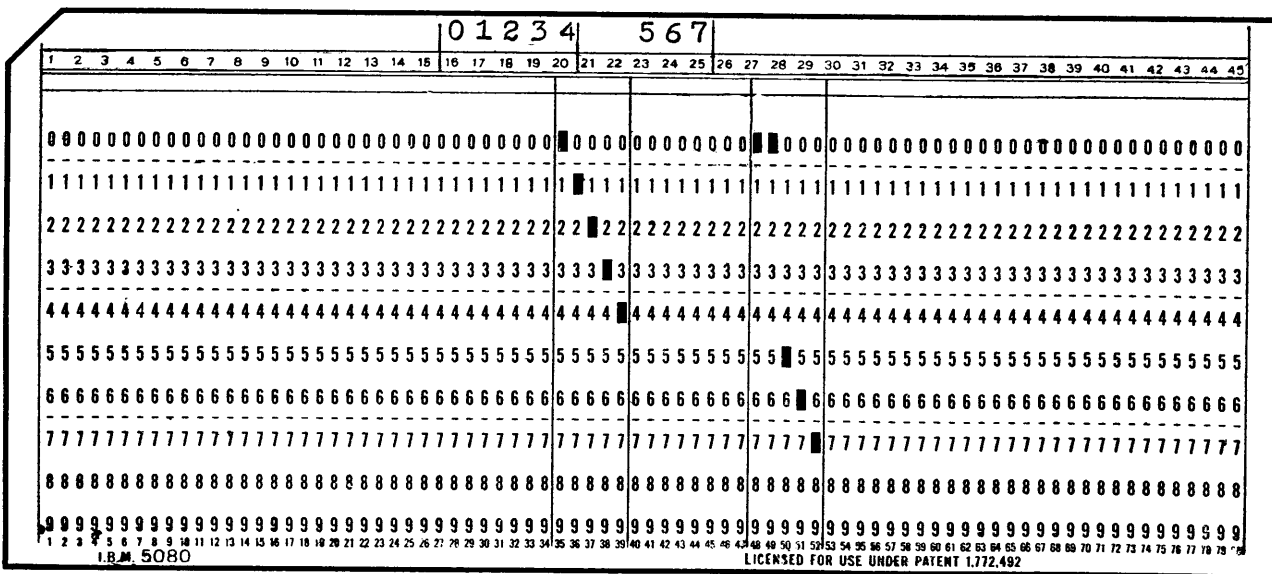
Printing a Zero Electrically.

Automatic Check Writing Interpreter (Type 551)

This machine is particularly designed for the purpose of translating the holes punched in tabulating cards and printing the resulting numerals in any desired arrangement, in legible form, on the face of regular tabulating cards or on tabulating card checks.

The printing can be accomplished in any one of five horizontal positions on the card. The first is at the extreme top of the card, where it is visible for filing and general work, and the lowest position is on a line 1 3/16" from the top of the card, which is the check-writing position. Between these two are three other equally spaced positions registering exactly between the punched positions.

Special large pin-point type may be used for check writing, giving a clear impression and affording extra protection to the check. Asterisks are automatically printed to cancel any unused positions in the space reserved for dollars, and the amount may be printed in two or more places if desired.

The machine may interpret forty-five card columns simultaneously. A full eighty-column card may be interpreted by using two lines of printing.

At the same time that figures are being interpreted in the check writing position, regular interpreter type may be used to repeat the amount or print some other class of data on the same line in other available printing positions.

Card feeding, plugboard arrangement, zero suppression, and electrical energy requirements are the same as for the Type 550 Automatic Interpreter. The speed, however, is 60 cards a minute.

Printing Position Control

The position on the card in which the printed characters appear may be varied so that the interpreted data will appear in any one of the five horizontal sections shown on the accompanying illustration.

The five positions of the card available for interpretation are the spaces (1) along the top edge of the card as on the Type 550 Interpreter, (2) between the 12 and 11 positions, (3) between the 11 and 0 positions, (4) between the 0 and 1 positions, and (5) between the 1 and 2 positions.

The changing of the line of printing is effected by setting a dial located on the back of the machine. The disc may be adjusted by pulling it out and turning it to the desired position.

Printing Position Control Dial

In setting the disc, one of the five index numbers (1, 3, 5, 7, 9 — representing the numbers of eighths of an inch from the top of the card at which the center of printing will appear) corresponding to the position of printing desired, should be made to coincide with the etched line on the shaft.

Special Type

The special pin-point type requires a type bar of double the width of the ordinary type bar. This slightly reduces the number of positions available for regular interpreting. The pin-point characters require 10/32 of an inch as compared with 5/32 of an inch for the normal bar. The height of both types of symbols is the same—one-eighth inch.

When the special pin-point type are placed in a machine for check writing purposes, these positions may be advantageously used for the interpretation of those fields which are used frequently for reference or filing. The special type makes these figures stand out from the other information appearing on the cards.

The tenth, eleventh, and twelfth position printing of the special width type bars is the same size as on the normal bar. These characters are printed in the regular type at the right of the double space.

Automatic Asterisks

The machine is arranged so that asterisks print automatically to the left of the last figure in the amount field, thus properly filling the amount space on the face of the check.

Special Devices for Interpreters

A. SELECTION OF PRINTING POSITION	B. FIELD SELECTION	C. CLASS ELIMINATION

NO X	1 2 0 0 0 DEBIT AMOUNT / DR. OR CR. AMOUNT	CREDIT AMOUNT	NO X	1 1 0 0 PRICE / DOMESTIC PRICE	FOREIGN PRICE	NO X	1 0 0 0 COST / COST	
0 0 0 0 0 0 0 0	▮▮▮0 0▮▮0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	▮▮▮0 0▮▮	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	▮▮▮0▮▮▮	0 0 0 0 0 0 0 0
1 1 1 1 1 1 1 1	1 1 1▮1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1▮▮1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1▮1 1 1	1 1 1 1 1 1 1 1
2 2 2 2 2 2 2 2	2 2 2 2▮2 2 2	2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2	2 2 2 2 2 2 2	2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2	2 2 2 2 2 2 2	2 2 2 2 2 2 2 2

X PUNCHED	2 1 0 0 DEBIT AMOUNT / DR. OR CR. AMOUNT	CREDIT AMOUNT	X PUNCHED	1 2 0 0 PRICE / DOMESTIC PRICE	FOREIGN PRICE	X PUNCHED	COST / COST	
0 0 0 0 0 0 0 0	▮▮▮0 0▮▮0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0	▮▮▮0 0▮▮	0 0 0 0 0 0 0 0	▮▮▮0▮▮▮	0 0 0 0 0 0 0 0
1 1 1 1 1 1 1 1	1 1 1▮1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1	1 1 1 1▮1 1	1 1 1 1 1 1 1 1	1 1 1▮1 1 1	1 1 1 1 1 1 1 1
2 2 2 2 2 2 2 2	2 2 2 2▮2 2 2	2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2	2 2 2 2 2 2 2	2 2 2 2▮2 2	2 2 2 2 2 2 2 2	2 2 2 2 2 2 2	2 2 2 2 2 2 2 2

Class Selection

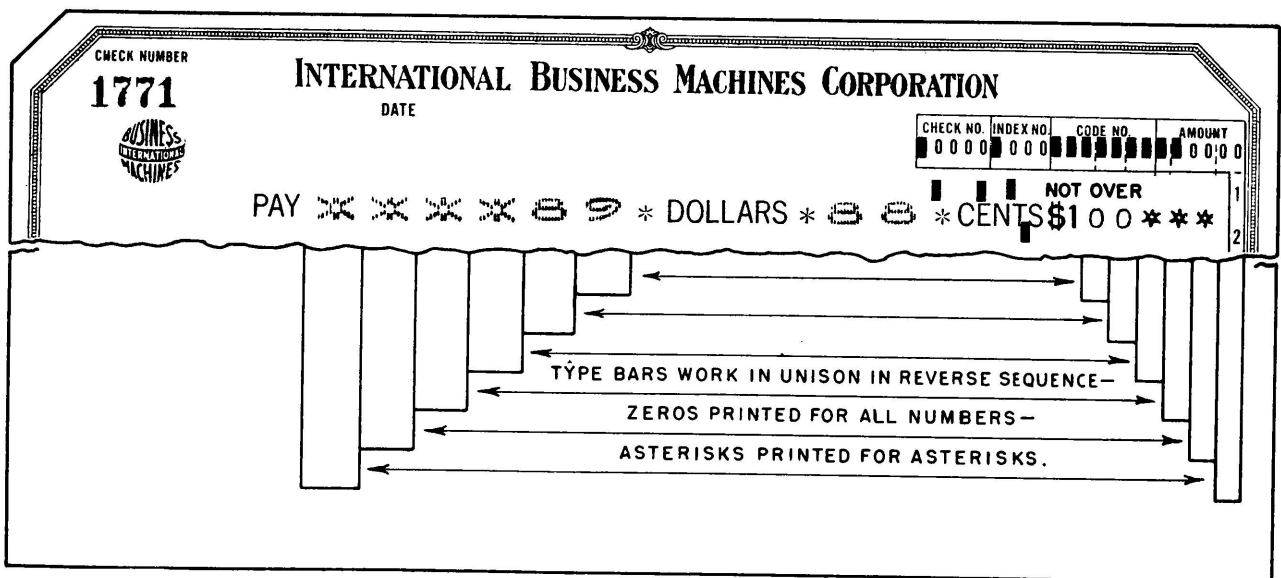### Class Selection Device for Interpreter

The Type 550 Automatic Interpreter and the Type 551 Automatic Check Writing Interpreter can be equipped with a ten-position class selection device which operates in exactly the same manner as the class selection device for tabulating machines. The use of this device is illustrated above.

Automatic "Not Over" Indication

The Check Writing Interpreter may be arranged to print an automatic "not over" indication when definitely specified. This is illustrated below and consists of special type bars and a special circuit which causes zeros or asterisks to print behind a fixed $1 symbol in such a manner that the next round number greater than the check amount is always indicated.

Type bars reserved for "not over" indication cannot be used on regular interpreting since they have zero type in every position except the asterisk position.

CHECK NUMBER
1771

INTERNATIONAL BUSINESS MACHINES CORPORATION
DATE

CHECK NO. | INDEX NO. | CODE NO. | AMOUNT
0 0 0 0 | 0 0 0 | ▮▮▮▮▮▮ | 0 0 0 0

PAY ✕ ✕ ✕ ✕ 8 9 * DOLLARS * 8 8 * CENTS $1 0 0 ✳ ✳ ✳

NOT OVER

TYPE BARS WORK IN UNISON IN REVERSE SEQUENCE—
ZEROS PRINTED FOR ALL NUMBERS—
ASTERISKS PRINTED FOR ASTERISKS.

Automatic "Not Over" Indication

```
1010100  99124389
1020100              2307475
1030100   4000000
2000100             18472149
2010100             32443920
2040100    107774
2060100   4000000
2200100               59676
2500100              3103824
2510100   4013777
2520100              4308713
2530100              2393200
2540100               806870
```

President's Office
```
                96301              28870
                 3615      3287    75000
               119948     11574   171491
               ?23224             336289
                         19441    281100
        17721           172400    278400
                                  525574
                                   52500
```

1004 Dean of Women
```
10041100   31763    694500
10042100    7092     29069
10043100     678
```

1005 Registrar's Office
```
10051100  165763           264469
10052100   75364   88134    431157
```

1006 Board of Regents
```
10062100   21319  999999080  150000
```

1100 Field Secretary and Alumni Association
```
11001100          44216     809700
11002100   6198              37508
11004100   3076       825    77014
```

1101 Editor's Office
```
11011100   81900           351600
11012100    7118   1000       8500
```

1102 General and Chemical Storehouse
```
11021100         134219    799614
11022100            6865    75675
11024100  312063            12346
11025100   37341
```
(11022100 90248)

1103 Employment Bureau
```
11031100   16655           399176
11032100    1227    514       7500
```

1103 - 3100 Income

1104 Housing Bureau
```
11041100   36110           240300
11042100    6696    500      13200
```

1105 Inter-Campus Trolley
```
11051100    79255           118000
11052100  1835231  343423    528687
11053100   223051            650000
```

1106 Inventory and Service
```
11061100   23432           539500
11062100   11306   10400     30000
```

1107 Library
```
11071100   575527            844749
11072100    27156   123340   332758
11073100    25870            163578
11074100   417260  2241832   506070
11075100    35827           2800000
```

File of Interpreted Cards Used For Budgetary Control