PREMIUM COLLECTIONS ON PUNCH CARDS

BY

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In recent years tabulating equipment has developed to the point where it has ceased to be simply a means for assembling statistical data and is now quite satisfactorily adapted to accounting routines. Although commercial accounting has been making increasing use of these developments and is now far advanced along this line, insurance accounting has been rather slow to take it up. This is less understandable because insurance companies were among the first and are among the largest users of this equipment. Possibly our backwardness stems from the fact that we are so familiar with the statistical uses of tabulating equipment that we have it "typed," as Hollywood would put it, for this one role and have failed to see its fundamental versatility.

It would seem, however, that insurance companies could more readily develop punch card accounting than could commercial institutions, because we already have the equipment and a trained personnel to handle it. For many companies the added use can be absorbed without greatly increasing the equipment already in hand, and much advantage can be taken of the naturally close correlation between a company's statistical and accounting functions. Much of one can be made a by-product of the other.

In fact, in an insurance company, statistical and accounting functions are so closely interwoven that it is difficult to know where the one ends and the other begins; as an example, premium and loss distributions are usually treated as statistical, whereas expense distributions are considered accounting, although quite frequently punch cards are used for the expense distribution.

The purpose of this paper is not to discuss the many possible uses that tabulating equipment can be put to in insurance accounting, though to date much on that subject has been left unsaid, but specifically to describe an actual application of the punch card method to premium collections. This has possibly been the subject on which insurance accountants have exhibited more resistance to change than on any other. It is raised for discussion periodically in accountants' meetings and is invariably voted down overwhelmingly, notwithstanding the fact that testimony is always available from a few, more courageous than the others, that experiments had been tried and that, surprisingly, the experiments worked.

It must be admitted, however, that few thoroughgoing experiments have been tried, and that many of the difficulties encountered have not been very adequately met. The writer trusts that in this paper he can demonstrate how the fundamental difficulties have been overcome and can clarify the

procedure sufficiently to show that the principles involved will apply under conditions differing from those encountered in his own company.

The punch card system of keeping accounts receivable is a direct out-growth of the ticket system.

Originally premium entries were posted to agents' ledger sheets item by item, with cash credits applied thereto as received; the balance in this ledger being the total of agents' balances due. This system was fairly acceptable under conditions where agents reported universally on the account current basis, although much difficulty was encountered in recording and keeping track of adjustment items whenever the agent's account current differed from the company record as posted in the ledger. Then too the system was found to be particularly laborious in the casualty business where outstanding balances had to be analyzed by line of business and where the rules governing the over-ninety-day non-admitted asset were applied on an item basis instead of as related to the monthly accounts current. The labor of detailed posting to the ledger added to the expense and inconvenience of the system.

The invention of the abstract system of premium recording made a decided advance possible in premium accounting methods. With little cost an indi-vidual collection ticket could now be produced as a copy of the original abstract. These tickets could be sorted and totalled by agents. These totals were posted to the agents' ledger and the tickets were filed in the agents' outstanding premium file. A physical inventory of the tickets would at all times be in agreement with the balance shown in the agents' ledger.

It was now possible to reconcile an agent's account current with the com-pany's entries simply by segregating the items reported. Where the agent reported items not yet entered by the company, or where there were dis-crepancies appearing between the company and the agent on a specific item, temporary debit and credit cards, made up by hand, were inserted.

Under the ticket system outstanding balances were easy of analysis because the detailed supporting items were compactly filed together.

The development of the ticket system also fitted admirably into the more recent rapid development of business on the so-called billing basis. On this basis agents do not report on accounts current, but rather await a bill from the company for items due to be paid. Usually, too, such agents, instead of remitting monthly in the full amount of the bill, send checks in from time to time during the month as items are paid to them. Obviously a system allowing for the orderly filing by policy number of open items, thus making them easily located and withdrawn upon payment and readily listed for billing, was of decided advantage under these conditions.

The Punch Card Ticket.—A dozen or so years ago it occurred to some adventurer in the business that if this ticket could be made in the form of

a punch card much of the time consumed by clerks at adding machines could be eliminated. The hitch here was that nothing but a machine could read punch cards and only numbers could be punched in them. These cards had to be read and handled by collection clerks, bookkeepers and billing typists, and all that could be done with punch cards was to sort and add them.

Accordingly this inventive genius devised the dual card, a horrible invention, as all machine operators will testify.

The dual card was the perfect hybrid of the ticket and the punch card, that is, it was a punch card with the abstract typing reproduced on it by a duplicating process. The dual card could be sorted and added. The adding by machine was of considerable advantage in the establishment of control figures for posting to the agent's ledger and in totalling the outstanding cards to establish the accuracy of agents' balances, and also, in some installations, in making an analysis by line of business. But the sorting function for most of us was grossly inadequate because collection clerks, through habit and convenience, required their files in agents' alphabetical order whereas the machine sorting brought them into agents' numerical order, and rare was the coding system which brought the alphabetical and numerical sequences together.

Some companies, attempting to establish their overdue (over 90 day) premiums by machine from the dual card, listed off items showing the required overdue months. This was fairly accurate, but not conclusively so, the two main difficulties having to do with installment payments and credits. The rule of installment payments is that when one installment is overdue, all subsequent installments are then overdue regardless of date due; and on credits, that no credit, regardless of date, can be used to reduce the overdue figure unless a debit on the same policy (or assured) is also overdue. In other words, credits can be applied only against their corresponding debits. Originally no strictly mechanical method was available for making these two selections.

As for billing, the dual card had definite limitations. An acceptable bill delivered to an agent required the name of the assured listed against each item, as well as certain descriptive information such as the line of business and special designations to call attention to special commission or collection treatment. Agents do not take readily to numbers and codes, making an alphabetical bill practically an essential. Some companies tried listing the items initially on the bill by machine and then reinserting the bill in a typewriter to fill in the additional information. Although this was a moderate time-saver, it was cumbersome, introduced added elements of error, and produced a none-too-good-looking hybrid result. The problem of mechanically selecting the items to be billed (unless the system called for

repeated billing of all items, which few systems did), presented difficulties. This was usually done by sorting out the required items and after billing, sorting them back in, agent by agent. All in all, and for good reason, billing by machine was never well received.

And, lastly, the dual card, as usually produced, was a most unhappy device from a mechanical standpoint. In the reproducing process it had to be moistened on one side and then dried, producing a swelling and warp to the cards. Frequently, also, bits of gelatine from the reproducing machine adhered to the card. Both of these hazards caused havoc to machine operation and operators' dispositions.

Key punching also was difficult since each item had to be punched on a card on which the typed information had already been reproduced. Spoiled cards required rewriting by hand, and the punching of collection cards usually had to be maintained as an independent operation from the punching of other statistical cards.

Basically, then, a rather high price was paid for the advantages gained in having punched holes in the old collection ticket. But the advantages were real since much more accurate controls were possible and some speed of handling was gained. All in all the dual card was an improvement over the abstract ticket.

The Alphabetical Interpreted Card.—The more recent developments in mechanical equipment have made it possible to overcome most of the difficulties inherent in the earlier systems discussed.

With the alphabetical punch card and interpreter a very satisfactory system can be developed and has been used in several recent installations. Although most of the equipment needed has been in use for several years, it has taken time and experimentation to develop routines and procedures thoroughly satisfactory for the purposes. The subject is still developing and, no doubt, many improvements in technique are still ahead. It can, however, be stated without hesitation that the alphabetical punch card method of premium accounting is economical, accurate and practical, and, when carefully planned, is a definite improvement over the other systems in use in company accounting departments.

The fundamental requirements which we tried to meet in establishing an acceptable system were roughly as follows:

1. The punching must be made readable (gelatine and chemical processes must go).
2. The punching must be coordinated with the statistical punching of the same item to avoid duplication of effort.
3. The card must show all information needed for normal collection procedures.

4. The billing to agents must be mechanical.

5. The establishment of overdue balances must be mechanical.

6. The balancing of agents' accounts must be mechanical.

Items 1, 2 and 3, above, are related, in that they marked our determination to do away with the dual card which we were then using.

1. *The punching must be made readable.* This was readily accomplished through the use of the alphabetical interpreter which prints on the top lines of the card the information cut into the card. This made the card (without benefit of gelatine reproduction) available for visual reference, and facilitated filing, cash application, and collection review. By eliminating the "prefabricated" dual card it was possible to accomplish requirement 2.

2. *The punching must be coordinated with the statistical punching of the same item to avoid duplication of effort.* Under the dual card system collection punching had to be independent of statistical punching. There are many elements of information common to both, such as policy number, agent's code number, and, frequently, premium, which had to be punched twice, resulting in wasted effort. Clearly, such information as is common should be punched only once. There are, however, many elements which are not common: for example, the collection card requires effective date, the statistical card expiration date; the collection card requires the name of the assured, the statistical card classification and exposure.

When all of the elements required in both cards were assembled, however, we found that we required more columns than are available on the card. It was, therefore, impossible to punch one card with *all* the information on it and reproduce the other from it. This was impossible, also, for another reason. We could not always count on a one-for-one agreement between collection and statistical cards. Where installment payments are involved a collection card is required for each installment; where more than one classification is involved a statistical card is required for each classification.

The "layer cake" card (see figure) answered these problems satisfactorily. In this card, the one card form is in fact several card forms in which common information is placed in the same columns for all, the remaining columns being assigned variously for the various forms, mechanical distinction between the various forms being accomplished by means of a single card code column.

In use, the operator punches the first card for an entry throughout, but on all subsequent cards skips the column fields that are common. By subsequently running the cards through a gang punch the common information is reproduced from the first card of a set to all those which follow.

There were two degrees of communality apparent; information which is common to *all* cards, both collection and statistical, and information com-

mon to only one type. The policy number must carry through *all* cards, but the name of the assured is desired only on all collection cards in the set. Two runs through the gang punch under varying set-ups were necessary to accomplish the result.

The premium presented even a third problem of communality. Here a simple one-for-one set-up called for the same premium on both cards, but where installment payments were involved or various classifications the premium might be different for every card. For premiums, then, we inserted a class selector in the gang punch process. The operator punches the premium or not as conditions require. If the premium is to be the same as she has punched on the preceding card, she skips the premium field. The class selector operates for all cards on which the operator has skipped the premium field and fills it in from the preceding card.

We had long felt it would be desirable in statistical work to have, for purely agency results, still a third type of premium card available, which would be independent of the normal statistical card. Congestion in the use of the statistical card had been severe and the increasing amount of diverse information required for both agency statistics and general statistics had considerably cramped our column capacity. We therefore separated the two functions, and inserted a third, or agency card in our "layer cake" set-up which had certain elements common to the collection card, and certain elements common to the statistical card. This very nicely made a bridge between the two original cards contemplated, and required no additional column punching *per se*.

This agency card has opened the door for several other valuable possibilities. By subsequent selected reproduction from this card a punch card expiration file is available which is possible of exclusively mechanical handling. Agents' expiration lists can be run on the tabulator showing the name of the assured mechanically. Special safe-driver-reward expiration cards can be made which can be processed at the end of the thirteenth month for mechanical operation of the reward system, even to the automatic writing on the tabulator of the reward check. The subject of a more widespread use of renewal certificates is active at the moment. It is quite possible that this card could be utilized in some modified form for the machine writing of certificates.

In introducing the "layer cake" card punching routine to our operators we were somewhat concerned lest the complexity (or so it seemed to us) of the routine and the necessary change in punching habits might reduce production and increase errors. We were most pleasantly surprised. Although a period of training for the operators was necessary, it has developed that competent operators master the new method readily. The saving in time made possible by the elimination of duplication has been felt. Prior

to the change we punched two separate cards, a collection card and a statistical card. Our collection card did not have any alphabetical information punched on it, nor did it have many other elements of information for which we depended on the reproduced typing of the dual card. We now produce three separate cards, a collection card, an agency card, and a statistical card. We have added the assured's name and many other elements of information, and found it possible to handle an even larger volume of entries than before without enlarging our force of operators.

3. *The card must show all information needed for normal collection procedures.* The most important new element was, of course, the name of the assured. This was achieved naturally with the use of alphabetical equipment. But there were other elements, hitherto not available in the key-punched card.

We had determined from the start not to show commission and net balance due on the punch card. Some installations do show these elements and have found a ready application for the multiplying punch in calculating the commission and in extending the net balance due. But our practices did not seem to warrant any such extension of the system. We had, however, to provide some means whereby items taking commission rates other than normal could be identified. Then, too, frequent items required more complete identification than merely the policy number, name of assured, effective date, line of business, and amount of premium. We, therefore, found it advisable to provide four columns on the card in which standard alphabetical abbreviations could be punched for certain explanations. In these columns standard abbreviations are punched for such items as premiums subject to safe driver reward, long-haul business, audits, endorsements, and commission group for large New York compensation lines, etc. Where more than one such explanatory note is needed, we borrow additional space from the field assigned to the name.

Some question arose as to whether the agent should be shown alphabetically, numerically, or both ways. Collection clerks, who were accustomed to seeing the name of the agent on all items were rather vehement in their insistence on an alphabetical name. There were several difficulties in the way of this, however. Any recognizable system, even with abbreviations, required more card columns than we could conveniently supply, and a numerical code was rather necessary, as well, for ease of sorting and control tabulating. We finally worked out a revised agency coding system which had the advantage of maintaining a constant alphabetical sequence. With the aid of a scientifically developed (not by us) frequency chart, the available code numbers were blocked off alphabetically and the existing agents assigned as they fell. New appointments are interpolated to maintain a strict alphabetical sequence. By the use of this agency code system, all

sorting and filing of collection cards becomes mechanical even though the file is in alphabetical order for easy reference by collectors, accountants and clerks. Identification of the agent's name is by reference to the name and address cards of a different color and corner cut, placed at the front of each agent's account.

Another advantage of this coding system has been that agency statistics can be produced mechanically and yet be in alphabetical order for submission to the busy executive.

4. *The billing to agents must be mechanical.* One of the real advantages to be obtained under the new system was the running of monthly bills on the machine. In fact this possibility was the basic reason for the use of an alphabetical punch card system.

With continuous forms, name and address cards for the heading, and the requisite information punched on the cards, the basic elements were available for billing. The problem to be solved was in the selection of items due for billing. It was our intention to run all cards in the billing agents' accounts through the machine without disturbing their order in the slightest, but to have only those items due for billing listed on the bill.

One of our basic difficulties here was the fact that all accounts do not follow the same set of rules. Most brokers and some agents are billed in sixty days, some agents in ninety; a few brokers' accounts require billing of all items regardless of date, except strictly advance items. Another difficulty was that we require all items on short term policies to be billed immediately and items on the installment plan to be billed thirty days sooner than normal items.

Originally we tried predating each individual item with a billing date which was independent of the effective date indicated. The machine was set each month to list all items showing a given billing date or older. This worked satisfactorily enough except that the predating was a decided clerical burden and opened an avenue for more mistakes than we liked.

More recently we have developed a machine set-up which determines all the items to be billed directly from the normal effective date shown on the card. Predating is no longer necessary. Installment and short-term items, however, must be coded with codes indicating that they are installments and short terms. Whether an item is to be billed in sixty or ninety days from effective date is determined by whether or not it follows an agent's name card which has originally been coded as for a sixty- or a ninety-day agent. This coding is done once when the name cards are established and requires no further attention. A holding circuit, set up in the wiring of the plug board, changes the sixty-day selection to a ninety-day selection as soon as a ninety-day coded agent's name card passes the brushes, and holds the ninety-day set-up for all detail cards until the next name card is reached at

which time it reverts to the sixty-day set-up unless that name card too is coded for ninety days. Whenever a detail card is reached which contains the special installment code the machine automatically selects for billing an additional month. The short-term code simply causes the item to bill immediately regardless of date.

Our billing is now truly automatic and much more accurately done than we have ever been able to do it before. The clerical time saved over the use of a battery of typists is material, and the bills are produced much earlier in the month than previously.

5. *The establishment of overdue balances must be mechanical.* The time-honored method in the casualty business of producing the overdue balances by hand selection and addition of each item has always been a laborious and inaccurate operation. Nor has it ever been possible to produce with any ease a listing of the detail making up the overdue balances, although such a listing, indicating assureds' names, policy numbers and effective dates would be a valuable record both for audit purposes and as an aid to collection men.

To produce such a list mechanically was naturally an aim. For the normal debit items we encountered little difficulty since they should be listed whenever they are ninety days past their effective dates. *Credit* items and *installments*, however, are more troublesome. As stated in a previous section the rules governing such items are:

a. A credit must never be shown as overdue, regardless of age, unless accompanied by an overdue debit on the same policy.

b. Installments must *all* show as overdue, regardless of due date, if a single installment on the policy is overdue.

Obviously neither of these conditions could be established by a system of precoding, since at the time the item is entered there is no way of knowing how such circumstances will stand at billing time.

Our initial system for overdue listing, like our first billing system, called for a precoded overdue date. This required some hand manipulation in the case of credits and installments which produced the desired results but was awkward and subject to error. Since it is not now in use, there is no need to go into it here.

We are now, however, using an entirely mechanical system for producing these results, dependent for its success on two simple rules of filing. When placing cards in the open file, credits must be filed *behind* debits on the same policy, and installments must be in strict chronological order with the earliest payment date first. Since these are natural filing rules they create no hardship.

The machine is set to list and add all *debits* which show effective dates

of ninety or more days past. Whenever such an item has listed, however, a *holding* circuit is set up for the next card following which requires the listing of that next card also if it is a *credit* on the same policy. This listing in turn sets up its holding circuit for the next item which also will list if it is a credit on the same policy, and so on until either the policy number changes or a debit is reached.

In the case of installments, whenever a debit item listing as overdue is also an installment item (sensed by the installment code prepunched on all installments as explained under billing), a second holding circuit is established which requires the listing of all subsequent items on the same policy, whether debits or credits.

Although the plug board diagramming for these circuits is rather involved, the actual operation is perfectly simple, requiring no more than the feeding of the cards through the machine.

6. *The balancing of the agents' account must be mechanical.* The entire open file of cards is run through the machine for the selective listing and totalling of the overdue items. At this same time the machine is totalling *all* cards in another counter and printing the total outstanding for each agent. (Twice a year, for audit purposes, we list *every* item, depending for our overdue record not on whether or not the item has been listed, but on whether or not the premium shows up in the overdue counter.) This establishes a mechanical inventory control of outstanding items which is a marked labor saver over the previous system of adding machine tapes.

We did, however, wish to go a step beyond this and make the entire agents' ledger control a mechanical one. In consequence we substituted a summary punch card system for the agents' ledger. With the use of the summary punch this is a comparatively simple operation. Instead of making postings to the agents' ledger, we merely punch summary cards automatically when the tabulating machine establishes the agents' total figures. Thus when tabulating premium entries (writings) each day for control purposes, we make summary cards for agents' writings. Cash application can be handled the same way. When these summary cards are sorted in with a set of balance cards for the previous month and tabulated, with the writings cards adding to the balance and the cash cards subtracting, the resultant balance is the new balance for each agent which should agree with the balance shown in the inventory taken in the overdue run. If they agree, of course, the account is in balance.

Actually we do not even require a visual checking for agreement, but make the machine demonstrate any lack of agreement. When making the overdue run we are punching automatic summary cards for each agent's inventory total. These cards are sorted in with the ledger control summary cards produced during the previous month before tabulating for the month's

control. A counter in the machine is set aside in which any difference shows between the inventory summary card and the ledger new balance. Normally this counter will show nothing. If an amount shows in this counter it is precisely the amount by which that agent's account is out of balance. After the tabulation is complete the operator locates the summary cards for any agent showing a difference, and lists them. Since this list will show the entry dates punched on the cards it is a simple matter then to refer to the original entry listings to locate the error. Usually such errors are the result of miscoding special journals; never yet has it been from a lost card. The inventory summary cards are then used the following month as the old balance cards.

CONCLUSION

The writer has tried here to confine himself to the more general aspects of the system in use.. There are, of course, many other minor details in our system which may or may not apply in any installation contemplated by another company. Much variation in detailed requirements is, of course, essential, as company practices vary. The point is that almost any obstacle to the punch card system can be overcome satisfactorily if the will exists to overcome it. And the results obtained have satisfied us that the effort was well worth making.

All in all, we have released considerable clerical labor to more fruitful fields of endeavor, we have speeded up our service, and gained in accuracy. We have more complete and satisfactory records for audit purposes, and have obtained many collateral advantages in the coordination of the accounting and statistical procedures.

While the initial establishment of the system calls for considerable concentrated effort, the actual day-to-day operation is, if anything, simpler than under a manual system.

The writer regrets that this paper comes at such an inopportune time. There was no thought of any such thing as a freezing order on business machines when he undertook to prepare it. Under the circumstances, therefore, many who might be interested in following the matter further must, of necessity, postpone the impulse for the duration of the war. For those, however, who now have the necessary equipment (and it is standard equipment), the application of some at least of the principles outlined here should serve to alleviate a few of the difficulties we are all encountering because of the war-time clerical shortage.

| 1 POL. SYM. 3 | 4 | POLICY NO. | 9 | 11 | EFFECTIVE DATE | 15 | 17 | NAME | 32 | 33 | PLAN | 36 | 38 | KIND | 39 | 41 | PREMIUM ALL LINES EX. | 48 | 50 | PROPERTY DAMAGE | 56 | 58 | STATE | 80 |

| 2 | RENEWAL NUMBER | 9 | 11 | AGENT'S NO. | 15 | 17 | BRANCH OFFICE | 20 | 22 TRANS | 33 | ENTRY DATE | 37 | 41 BILLING | 43 OVERDUE | 46 INST. |

COLLECTION CARD

| ENTRY | CARD NO. | GROUP | BILLING | OVERDUE | BILL. YR. | OVER. YR. | EFFECTIVE DATE MO. DAY | YR. | INST. | LINE | A.C. NO. | STATE | TRANS. | PREMIUM ALL LINES EXCEPT P.D. | PREMIUM PROPERTY DAM. OR OVERWRITING | TOTAL PREM. OR RENEWAL NO. | BORD. NO. | BR. OFF. NO. | AGENT'S NO. | POLICY NO. | POLICY SYMBOL | PLAN | NAME |

REMARKS

AGENCY CARD

| ENTRY | CARD NO. | LINE | STATE | EXPIRATION DATE MO. DAY | YR. | POL. YR. | TRANS. | REINS. CO. | CREDIT | PREMIUM ALL LINES EXCEPT P.D. | PREMIUM PROPERTY DAM. | INST. | SUB AGT. | REINS. ACC'PD CO. | BORD. NO. | BR. OFF. NO. | AGENT'S NO. | POLICY NO. | POLICY SYMBOL |

STATISTICAL CARD

| ENTRY | CARD NO. | LINE | TERM | EXPIRATION DATE MO. DAY | YR. | POL. YR. | TRANS. | REINS. CO. | RATED MIN. | PREMIUM ALL LINES EXCEPT P.D. | PREMIUM PROPERTY DAM. | T.C. | REINS. ACC'PD CO. | ORIGINAL PREMIUM ALL LINES | EX. P.D. | POLICY NO. | POLICY SYMBOL | STATE | TERR. OR CITY | B.I. LIMIT | P.D. LIMIT | CLASS | EXPOSURE |

FIREMAN'S FUND IND. CO. - N.Y.C. 882 -3-1-40-E.D.   LICENSED FOR USE UNDER PATENT 1,772,492   IBM 713300

THE "LAYER CAKE" CARD

Note: As explained in the text the predated billing and overdue months and years,
columns 7 to 10, are now obsolete and not in use in our system, the selection
being done entirely from the effective date shown.