

CREED MODEL 75 TELEPRINTER

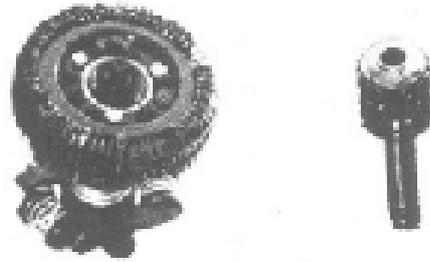
(Reprinted from the Spring 1962, Golden Jubilee, issue of "Creed News")

It all began in 1954 with the advent of the now well-known Model 54 Teleprinter. This was introduced as a de-luxe version of the famous Model 7 which had, in turn, made its debut more than 20 years before. A very advanced machine for its time, the Model 7 Teleprinter pioneered many then revolutionary features which are now taken for granted - some of which have since been copied by our competitors! Over the years user requirements changed and communications techniques improved but, thanks to the sound basic principles employed, it proved possible to incorporate in the Model 7 most of the new features required. The outcome was a machine that differed in many respects from the original 1931 design, and so it was decided to distinguish the latest version having all the "trimmings" with a new model number derived from its year of introduction.



However, the long period of continuous development had imposed a penalty in terms of increased size, weight and general complexity, and the Model 54, though a good general purpose machine adequate for most needs, was considered by some to be overly cumbersome. Moreover, it was becoming increasingly difficult to add new facilities without further adding disproportionately to its size and weight. Clearly, the basic design had reached the limit of its development life and the time had come to take stock for the future. So, in 1954, came the decision to make a completely fresh start and design a new page model teleprinter from

the base up which would, in the simplest and most direct manner, meet all modern requirements and at the same time provide maximum development potential to meet future needs as they arose.



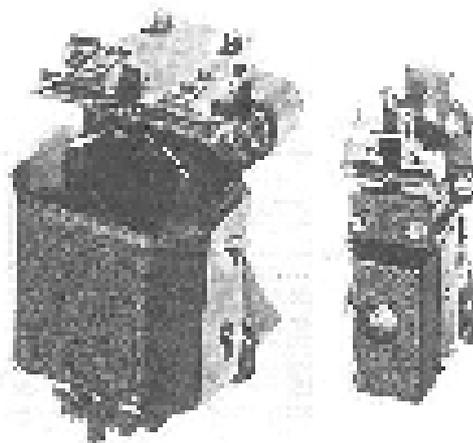
Comparison of head sizes:
Model 54 Left, Model 75 Right

Specifications were thereupon drawn up calling for a teleprinter only about half the size and weight of existing models, yet capable of operation at 100 words per minute (a 50 per cent advance), while providing a much wider range of facilities than before, with reduced maintenance. A challenging assignment by any standard. A period of intense development work then followed. As expected, this was not plain sailing by any means because a radical departure from previous techniques was necessary. Completely new principles introduced completely new problems and the answers had to be found the hard way. Pure ingenuity and a certain amount of trial and error were the only solutions. Ideas were tried out and revised, some were discarded, others retained. Models were made, modified, stripped down, rebuilt and modified again. Many a promising idea failed to live up to expectations which meant starting all over again on the drawing board.

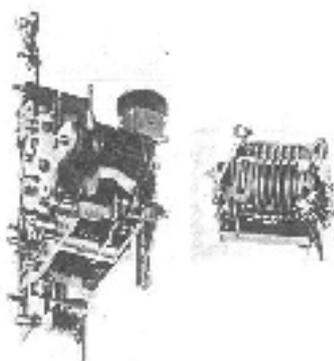
First Prototype

Nevertheless, progress was gratifyingly rapid and inside a year the first prototype Model Seventy-five was turning over under its own power. Naturally it lacked many refinements, but at least it proved the principle and amazed all who saw it by its small size and extremely light weight. This was an encouraging start and after a period of development a number of pre-production models were assembled and shipped to customers in various parts of the

world. These customers were asked to operate the machine on their most heavily worked circuits, since it was felt that no amount of laboratory testing could simulate exactly the wear and tear of actual field use. Unfortunately, this good idea did not entirely come off as it transpired that many of the machines were seized by the users' own engineers, eager to discover the new principles involved, and never reached the the traffic and operating personnel who could have carried out proper field trials. All the same, a good deal of helpful user comment was obtained which served as a basis for subsequent development work.



*Comparison of electromagnets:
Model 54 Left, Model 75 Right*



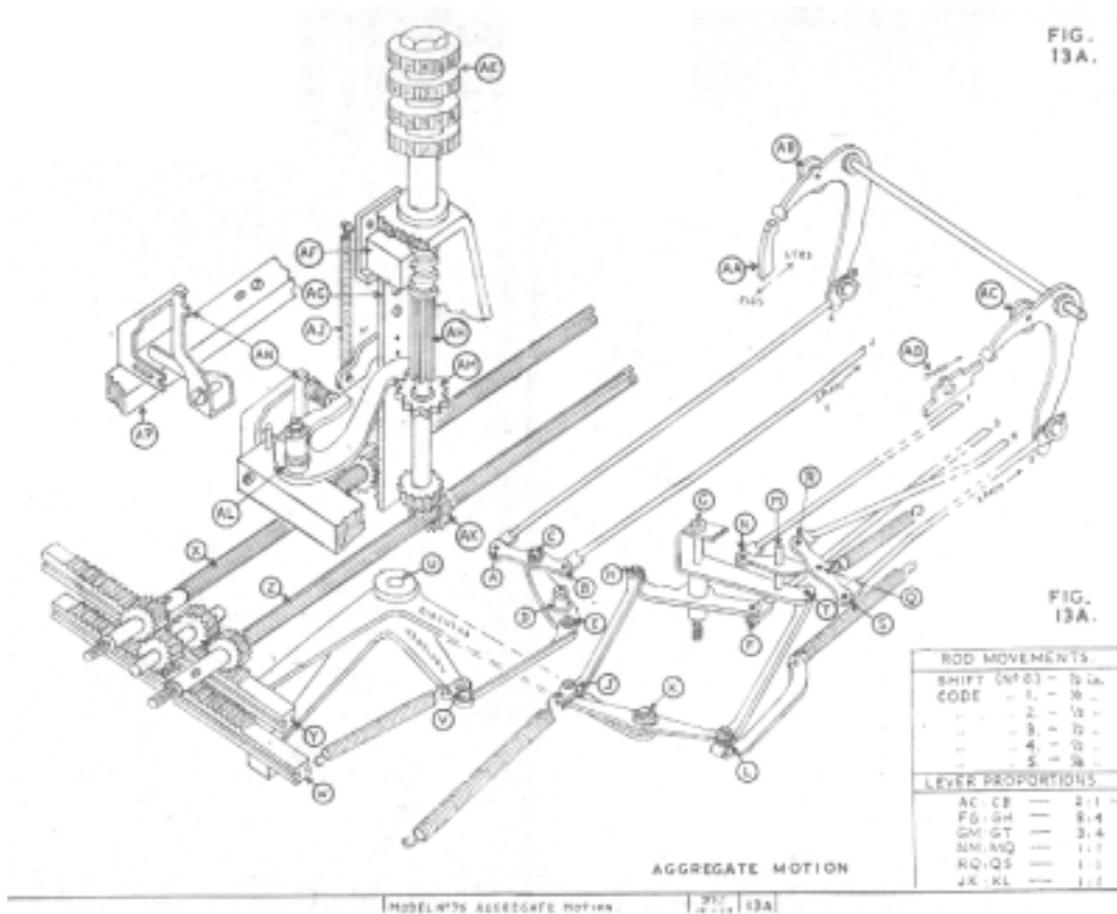
*Comparison of answer-back units:
Model 54 Left, Model 75 Right*

One of the most encouraging events during this period was the trial carried out by the British Overseas Airways Corporation (BOAC) in the use of the machine in one of their aircraft. An important feature of the Model Seventy-five is its ability to operate in non-level positions, a matter of vital importance in mobile installations and other situations where the machine is likely to be subjected to tilting or vibration. This feature, allied to its small size and low weight, attracted BOAC to investigate the possibility of using the Seventy-five for in-flight reception of messages broadcast from ground radio stations. So, in March 1956, a pre-production model was installed in a BOAC Stratocruiser on a regular passenger flight from London to New York. The trial proved highly successful, the machine continuously printing out weather data and other essential flight information transmitted from radio stations in Galdenoch, Scotland, and Halifax, Nova Scotia. Since then BOAC have installed the Model Seventy-five as an airborne receiver in many of their aircraft on the Atlantic run and it is now essential equipment in their fleet of Boeing 707's.

Production Commences

The first production versions of the Seventy-five were shipped from Croydon early in 1958 and to date over 8,000 units have been sold to customers in over 50 countries. Not only is it smaller and lighter overall than any other comparable teleprinter in production anywhere in the world, it also offers an exceptionally comprehensive specification combined with 100 wpm operation if required.

The most immediately obvious innovation incorporated in the new teleprinter is the moving typehead. While earlier machines operated on the normal typewriter carriage principle where the type remains stationary and the paper moves to and fro, the Seventy-five does exactly the reverse. The complete printing unit traverses the width of the paper, printing character by character as it goes. The adoption of this system is one of the reasons why the Seventy-five is so much smaller than its predecessors. The absence of a bulky carriage moving back and forth allows a saving of something like 7 1/2" in the width of the printer. The stationary platen also eliminates the problems encountered when the paper must follow the to and fro movement of the carriage, and allows the use of page winders for the take-up of printed copy.



An interesting optional feature is a dual-purpose platen which accommodates either plain message paper or multi-copy sprocket-fed business stationery such as order forms, invoices, advice notes, etc. On the Models 7 and 54 Teleprinters two separate units are required for friction-feed and sprocket-feed paper, but on the Seventy-five it is merely necessary to operate a lever to cause the necessary pins to pop up to engage with the holes in the paper. Customers can therefore change from plain friction-feed paper to sprocket-feed business stationery with much less cost and fuss.

Aggregate Motion

A feature of considerable technical interest is the aggregate motion principle used to select the characters to be printed. Incoming signals modify the position of a simple arrangement of six levers that are linked together to control two horizontal racks. The first rack lifts the typehead to bring one of its four rings of types up to the level of the paper and the second rack rotates the typehead to bring the required character to the printing point. The

high-speed movement of the typehead never fails to astonish those seeing it in action for the first time. It has, in fact, four different movements because, in addition to the two just mentioned, it strikes forward against the ink ribbon to print the characters on the paper and then smartly moves sideways one step in its travel across the platen. For a split-second in each print cycle the typehead actually performs all four movements simultaneously - far faster than the eye can follow.

Four high-speed movements every tenth of a second, hour in hour out, impose a tremendous strain on the material used in the manufacture of the typehead. A plastic bonded fabric laminate was finally selected as the best for the job and the makers, Formica Ltd., featured the Seventy-five in a series of trade press advertisements when they heard of its adoption in the new printer. They followed this publicity up by a short cine film sequence at Telegraph House for inclusion in a full length film on the use of their products.

The policy of making a completely fresh design

approach to every individual unit of the machine has paid dividends as can be seen by comparing the new electromagnet, typehead, and answer-back unit with those of the earlier printers. Such striking reductions in size would not have been possible simply by adapting previous units.

Further Developments

But all of this was only the beginning. From the outset the Seventy-five was intended to be not only a complete and self-contained machine, but also the basic unit of an integrated family of equipment to be produced by the addition of special attachments or by modifying the machine in various ways. Such a plan results in considerable advantages. For example, customers having more than one of the related types of machine can hold smaller stocks of spares, maintenance arrangements are simplified, while overall development time is reduced and manufacturing economies made possible.

Reperforating Attachment

The first of the attachments to be introduced was the reperforating unit. This immediately increased the versatility of the machine by providing means whereby incoming messages could be recorded in punched paper tape simultaneously with normal page printing. It also enables the machine to be used as a keyboard perforator for the off-line origination of tape with the benefit of a printed page guide for the operator. The addition of tape punching facilities was of importance not only for conventional communications work but also for data processing applications in which the machine is now used extensively both for output printing and tape editing operations.

Data Processing

For many applications in the data processing field a five-wire parallel input/output is desirable. In ordinary telegraph applications the signals that operate the teleprinter are supplied to it one after the other over a single wire. This "sequential" mode of operation is used because it is economical in line and channel requirements. In data processing, however, the teleprinter is generally located only a few feet away from its signal source and so the question of circuit economy does not arise as it

would in telecommunications applications where the connecting wires may be hundreds or even thousands of miles long. In data processing, therefore, a parallel mode of operation is commonly employed. This involves the use of a separate wire for each of the five elements of the teleprinter code and the transmission of the whole code group simultaneously over the five wires to the receiving machine. By this means, a whole code group can be transmitted in only 20 milliseconds compared with the usual sequential speed of 150 milliseconds.

Previous teleprinters could not accept these simultaneous parallel signals directly and additional electromechanical or electronic devices had to be used to convert parallel signals into a train of sequential signals that the teleprinter could understand. The basic design of the Seventy-five however, was such that it could readily be adapted to operate directly from a simultaneous parallel input, so eliminating the inconvenience and cost of the parallel/sequential conversion stage formerly required. This theme has since been exploited in numerous ways, and facilities provided as a result include parallel/sequential and sequential/parallel conversion, combined parallel and sequential operation in one machine, high-speed cross-office links and the recognition of selected characters for switching purposes.

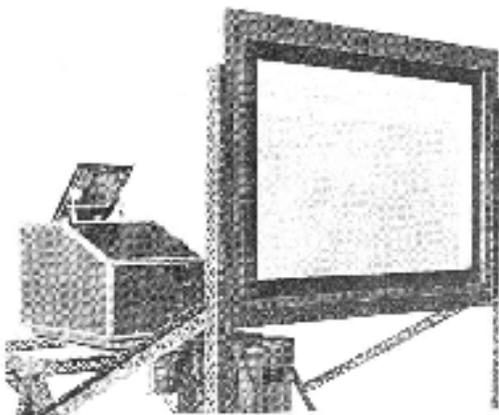
Further members of the growing Seventy-five family that have now appeared include the Projector Printer, the Printing Reperforator, the Film Titler, the Printing Card Punch and the Tape Reader Attachment.

Projector Printer

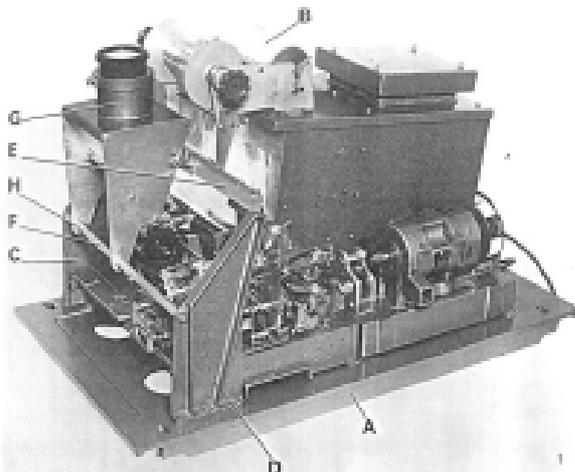
The Projector Printer got into the headlines shortly after its inception when in prototype form it was used by the BBC in their special television broadcast of the US Presidential Election results in 1960. For some applications it is necessary for an audience to view teleprinter messages at the moment of reception or transmission but, of course, only two or three people at a time can stand around a single machine.



The Projector Printer overcomes this problem by flashing the message on to a translucent screen, using conventional back-projection principles.



With a screen of about 3 feet by 2 feet and a 5 feet "throw", messages are projected about 10 times normal size and can be clearly read at a surprising distance and by a large number of people simultaneously.



Datacom Reprint

Printing Reperforator

The Printing Reperforator, in common with the parent machine is notable for its small size, light weight and 100 wpm capability. Unlike the Model 85 Printing Reperforator, which it is designed to supersede, it does not produce "chadless" tape but prints the message between the sprocket-feed holes of fully-punched 5-track tape. It can, moreover, punch two tapes simultaneously.

Film Titler

The Film Titler is a development of the ITT Federal Laboratories, Nutley, New Jersey, USA, and is designed to provide fast, accurate, durable printing of captions on film negatives. Basically the Film Titler is a Model Seventy-five fitted with a special gold-leaf ribbon that imprints the film with highly legible, lasting, gold-lettered identifying captions. The process is 20 times faster than conventional pen-and-ink methods, is able to title film at speeds of up to four frames per minute and can be adapted to any size of roll film up to 9 1/2" wide. Manual input is via the teleprinter keyboard while associated punched tape facilities provide for automatic printing of repetitive information.



Printing Card Punch

A development of the Seventy-five printing Reperforator, the Printing Card Punch is designed to punch and print edge punched unit record cards. These cards have gained some popularity in certain office automation systems as they provide a data storage medium which is not only convenient to

handle and file but is sufficiently durable to stand up to repeated use. The cards are normally 3" wide by 7" long and have 5-track teleprinter coding punched along one edge of their length, hence the name - edge punched cards. An example of their use is in order processing systems. Coded into the cards is the standing information about each product item, etc., and when an invoice is to be prepared the appropriate cards are drawn from the file and inserted, one after the other, into a card reader (a modified version of our Model 92 Tape Reader). This interprets the coded data and actuates another teleprinter to reproduce the information on invoice forms, while typing on the teleprinter keyboard provides for the insertion of variable data such as item quantities. The new Printing Card Punch can either be operated manually from its keyboard or automatically from punched paper tape or edge punched cards, via the appropriate reader equipment.

Tape Reader Attachment

Finally, we come right up to date with the introduction of the new Tape Reader Attachment, which is about to go into production. Until now a separate automatic tape transmitter unit, driven by its own motor, has been required to handle punched tape messages, but this is no longer necessary with the introduction of the new Tape Reader Attachment. This, in conjunction with the printer, does the same job as the separate transmitter but takes up far less space and is only about half the price. The new Tape Reader Attachment fits on the right-hand side of the printer, above the reperforating attachment, and operates at 60, 66, 75 or 100 wpm. Its compactness may be judged from the fact that it only increases the width of the basic printer by only 2 1/2" while adding nothing to its depth or height.

A special optional feature is a remote control device. This permits an attachment already loaded with a message tape to be started up under the control of the distant station. It is therefore possible for transmission to take place even when the sending machine is unattended. The Tape Reader Attachment can be fitted either to the basic Seventy-five, with or without keyboard, and to the machine with reperforating attachment. When fitted with both attachments, the Seventy-five is an

outstandingly versatile machine that can (1) send and receive messages in printed page form like a Model 7 Teleprinter; (2) punch up tape like a Model 7P/N Keyboard Perforator; (3) reperforate incoming messages like a Model 7TR/3 Reperforator, and (4) transmit messages automatically from tape like a Model 6S/6 Auto-Transmitter. And perform other functions besides! A bench more than six feet long would be necessary to accommodate all the above machines yet the Seventy-five, even with its attachments measures only 18 1/4" wide by 17 3/4" deep.

Uses and Users

As already noted, over 8,000 Seventy-fives have now been delivered, or are on order, and we could fill the rest of this magazine with descriptions of its applications . . . the large number serving Reuters and other leading news agencies . . . those aboard ships of the Royal Netherlands Navy . . . the hundreds for the Canadian Army . . . the scores in service with electronic computers . . . those doing key jobs in automatic systems of various kinds. . .

Notes on Aggregate Motion Diagram

Schematic diagram of the aggregate motion mechanism used on the Seventy-five.

Proportions of levers:

- AC : CB = 1 : 1
- ED : DC = 1 : 1
- FD : DH = 3 : 1
- IF : FG = 4 : 3
- LK : KJ = 1 : 1
- PN : NQ = 2 : 1

Rod Movements:

- Shift = 1/2"
- Elements 1, 2, 3 and 4 = 1/2"
- Element 5 = 1/4"