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THE SIEMENS AND HALSKE TELEPRINTER, T-TYPE 68

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THE SIEMENS AND HALSKE TELEPRINTER, T-TYP 68

BY

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A B S T R A C T

Describes a new pattern tape recording teleprinter of substantially different design to those previously manufactured by Siemens and Halske and which incorporates facilities for easy conversion to a unit suitable for tape relay operation.

INTRODUCTION

Objective:

To investigate development in German teleprinter design during the war years, and in particular, a new teleprinter manufactured by Siemens and Halske, known as their type T-Typ 68.

Evaluation:-

The design is radically different from the types previously manufactured, and although not in the production stage before the conclusion of hostilities, tests of the models available and the capabilities of the engineers concerned in the design show that definite improvements have been effected.

Guide to the Reader:

This report summarizes investigations made at the Siemens & Halske factories at Berlin and Munich. Four photographs and five drawings are included. The drawings were the only ones available, the remainder having been lost from the Berlin factory in 1945.

GENERAL DESCRIPTION OF TELEPRINTER

T-TYP 68

The design, commenced about five years ago, was intended to provide the Wehrmacht with a machine requiring minimum maintenance, light in weight, and exceptionally robust. It is in many respects radically different from the patterns previously manufactured by Siemens and Halske. It is very compact and although the design is influenced by Service requirements the possibility of applying the machine to commercial use has been retained. The War finished before the production stage was reached. Fifteen samples were made and twelve of these were delivered to the Wehrmacht. The remaining three are in the possession of the firm, two at Berlin and one at Munich.

The essential components of the machine are a typewheel tape receiver and a four-row keyboard transmitter. It is designed for single-current operation at 40 mA. Receiving reperforator and automatic transmitter units may be added when required. In one model examined, (Figs. 1 & 2), which was without these two attachments, the received characters were printed on 3/8" gummed tape. A second model (Figs. 3, 4 & 5) was fitted with both attachments and the 11/16" tape from the reperforator was arranged to pass beneath the typewheel; characters were thus printed on the reperforator tape about one-inch ahead of the corresponding perforations between the second horizontal row of punch holes and the feed holes. The printed characters are small script (see Fig.10) in agreement with the growing practice in Germany for telprinters of all kinds. It is understood that in any further development of the machine provision will be made for using separate tapes for the reperforator and the tapewheel receiver when desired.

A dial and key can be fitted, at the top left hand corner of the machine above the keyboard as shown in Fig. 3, for calling over the automatic teleprinter exchange network. A motor starting relay, to be controlled by the distant station, and a timed cutoff device operating with a delay of thirty seconds, are also provided.

An answer-back device has not been incorporated but is understood to be in course of design.

The instrument is fitted with three shafts, parallel to each other and all at right-angles to the front of the machine, known as the transmitting, receiving, and printing shafts respectively. Each is driven from the common motor through separate gears and a separate start-stop clutch, shown in Fig. 2(A). The transmitting and printing shaft clutches are toothed, and the receiving clutch is of the friction type.

The transmitting shaft, which is the left-hand one of the three on Fig. 2 (A) operates six separate transmitting levers, in accordance with the positions of the code bars. The levers are provided with adjustable transmitting contacts of platinum-iridium.

The receiving shaft, which is the center one of the three shown in Fig.2 (A) carries cams which move the five receiving selector fingers to selected or non-selected positions as determined by the movements of the armature of the receiving electro-magnet. A feature common to Siemens and Halske teleprinters is incorporated in this mechanism, whereby the armature of the electro-magnet is closed by local mechanical means at the commencement of the period allotted to each of the five selecting impulses. The line current controls the position of the armature for a fraction of the impulse only, and its function then is to release the armature or to retain it in the closed position. The designers claim that this method gives greater reliability of selection than the more usual one in which the movement of the armature is dependent on the line signal alone. The receiving electro-magnet (detailed in Fig.8) is mounted between the transmitting and receiving shafts (Fig.2. plan). Optimum adjustment of the armature spring is effected by means of the range disc located on the front panel between the calling dial and the typewheel.

Each selector finger determines the position of one of five code rings arranged in the form of a drum, the code slots being formed on the inner edges of the rings. The drum is mounted concentrically with the printing shaft, (the righthand shaft in the plan of Fig 2 (A)), which carries a search bar pressed against the inner edges of the code rings by a spring (see Fig.2(E)). The search bar is rotated by the printing shaft until a position is found at which slots in the five code rings coincide. The search bar then drops into the slots and is held. Further rotation of the printing shaft causes a printinghammer to strike the paper tape against the continuously-revolving typewheel, and thereafter to withdraw the search bar from the code slots in readiness for the next selection.

Satisfactory operation of the printing mechanism requires high grade material and precision machining in the manufacture of the code rings and search bar.

KEYBOARD

The keylevers in the four-row keyboard actuate straight code bars mounted transversely below the levers in the usual manner. The top row of keys is allotted exclusively to the ten numerals; the letters of the alphabet are arranged on the other three rows of keys as in British and American instruments with the exception that the positions of Y and Z are transposed.

Signals are transmitted in the standard teleprinter code, according to C.C.I.T. Alphabet No.2. The seven impulses of each character are all of twenty milliseconds duration, giving a signalling speed of 50 bauds and a maximum rate of output, for keyboard of automatic transmission, of 428 letters per minute. Three auxiliary keys, fitted apart at the left-hand end of the keyboard provide for:

- a. Initiating a call, prior to dialling
- b. Sending blanks,
- c. Locking, for continuous transmission, the character corresponding to the key previously depressed in the main keyboard.

The "LOCK" key may be used, for example, to transmit a succession of spaces at the end of a message.

REPERFORATOR ATTACHMENT

When a reperforator unit is required it is mounted towards the front of the machine to the right of the typewheel, as shown in Figs. 3 and 4. The five punch rods, shown in Fig. 9 are controlled by the selector fingers previously mentioned, and the punch hammer and tape feed pawl are operated by cams on the printing shaft through the two levers also shown in Fig. 9.

AUTO-TRANSMITTER ATTACHMENT

When the automatic transmitter attachment is required it is fitted at the lefthand side of the machine behind the dial, as illustrated in Fig.5. By means of a three-position knob located below the dial the control of the transmitting levers can be transferred from the code bars of the keyboard to the peckers of the automatic transmitter. In its third position the knob causes "RY" to be transmitted continuously. Two short extension arms on the automatic transmitter are actuated by cams on the transmitting shaft to operate the peckers and feed the perforated tape. (see Fig. 6)

MISCELLANEOUS NOTES

The dimensions and weight of the complete instrument are approximately as follows:-

Width	330 mm
Height	250 mm
Depth	380 mm
Weight	17 kg.

The versatile nature of the instrument, in conjunction with its compactness and the simplicity of its essential parts, render it an interesting development. That there is scope for its use commercially in any but limited numbers is doubtful, however, since on the one hand, the present-day preference is for page-printing instruments, and on the other, in large teleprinter installations the advantages of multi-purpose instruments cannot be fully utilised. A good deal would depend upon the price at which the instrument could be produced. No figure for this could be given, but it was understood from the personnel interviewed that the manufacturing cost was likely to be considerably less than that of their established models.

Although results of service trials are lacking, it is felt that the capabilities of the engineers concerned in the design are such as to ensure that in the production form the instrument will be sound and reliable.

APPENDIX I

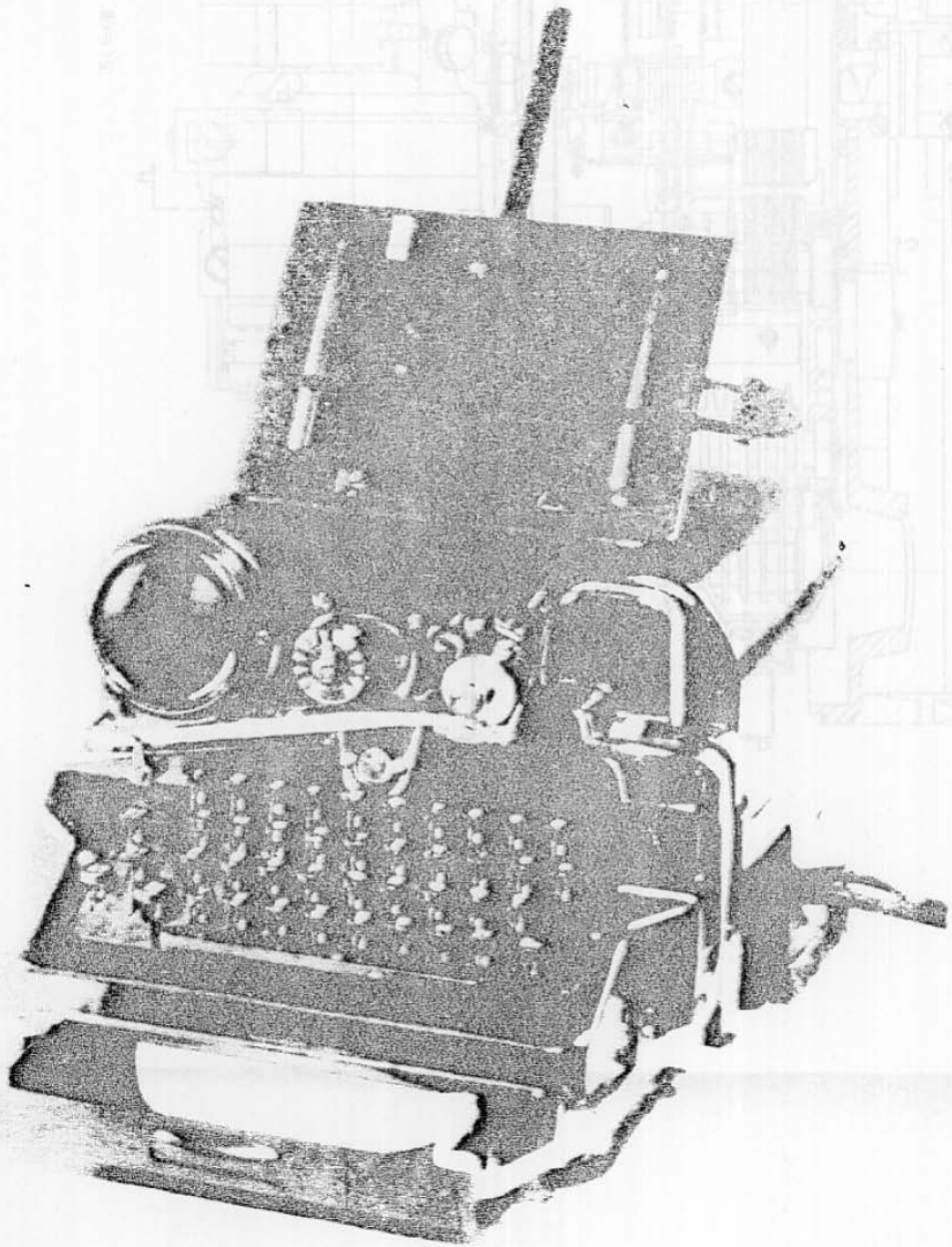
LIST OF GERMAN PERSONNEL INTERVIEWED

<u>Name</u>	<u>Position</u>	<u>Location</u>
Herr Paul Storoh	Director	Siemens & Halske
Herr Wessling	Sales Manager	Munich
Herr Ensinger	Chief Engineer	Hoffmannstrasse, 51
Herr Loelke	Construction Engineer	"
Herr Kreutzer	Telegraph Engineer	"
Herr Fritz Butzke	Development Engineer	"
Herr Jipp	Chief Engineer	Berlin - Siemensstadt
Dr. Jost	Development Engineer	"
Dipl. Ing. Wuesteney	Chief of Telecommuni- cations Laboratory	"

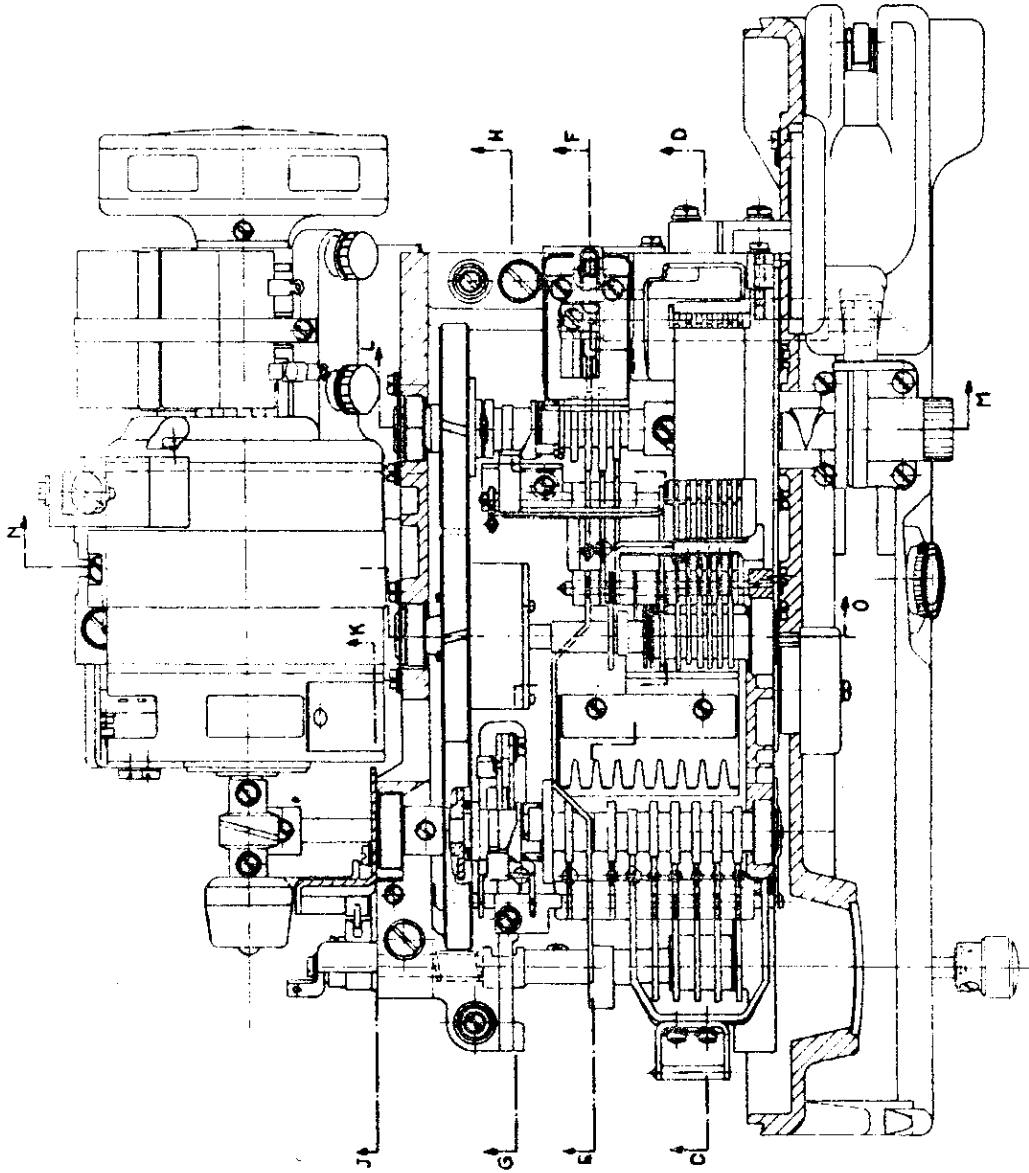
A P P E N D I X II

LIST OF DRAWINGS AND PHOTOGRAPHS

<u>Figure No.</u>	<u>Description of Drawing</u>
1	Photograph of instrument when used as ordinary tele-printer.
2-A thru F	Drawings of main assembly (six sections).
3	Photograph of instrument fitted with attachments (front view).
4 and 5	Photograph of instrument fitted with attachments; cover removed showing auto-transmitter unit.
6	Drawing of auto-transmitter unit assembly.
7	Drawing of translator unit assembly.
8	Drawing of electro-magnet and armature assembly.
9	Drawing of reperforator assembly.
10	Specimen of received printed tape.

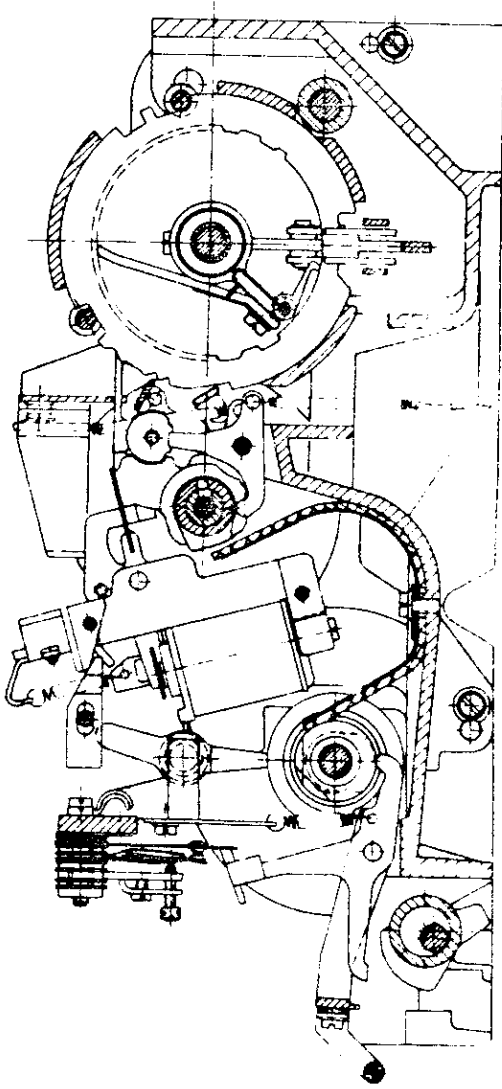


Schnitt A-B

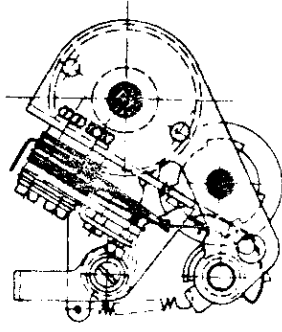


2A

Schnitt C-D



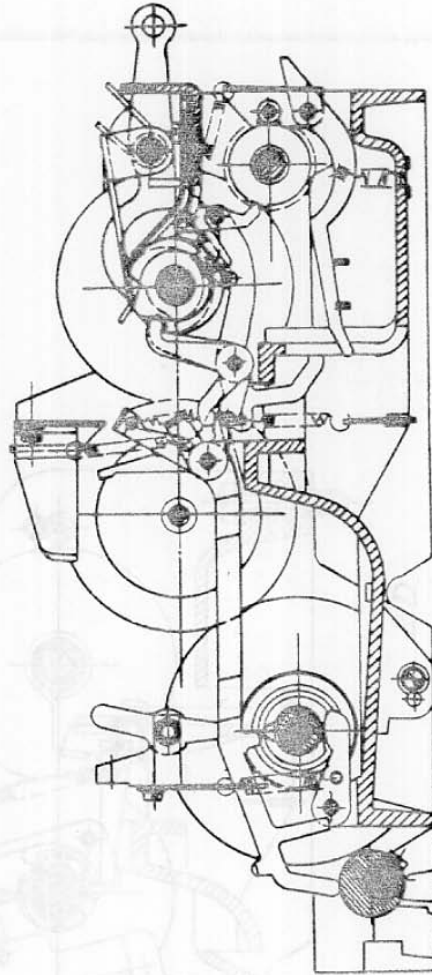
Schnitt J-K



2B

Schnitt E-F

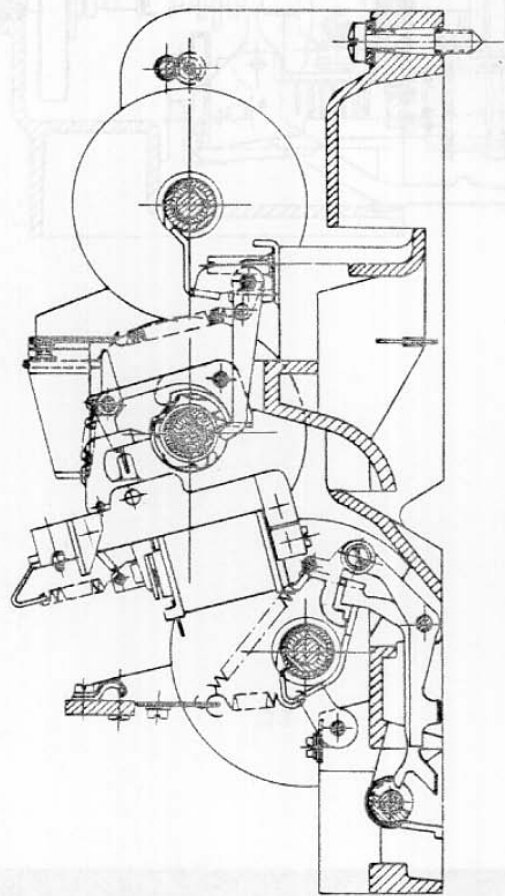
Schnitt E-F



20

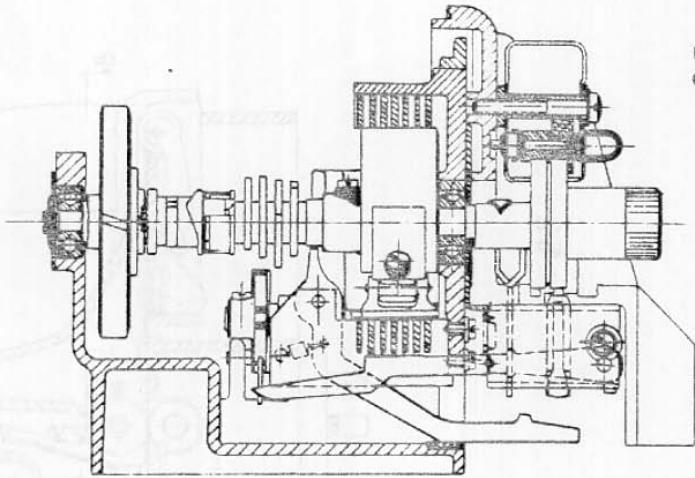
Schnitt G-H

Schnitt L-M

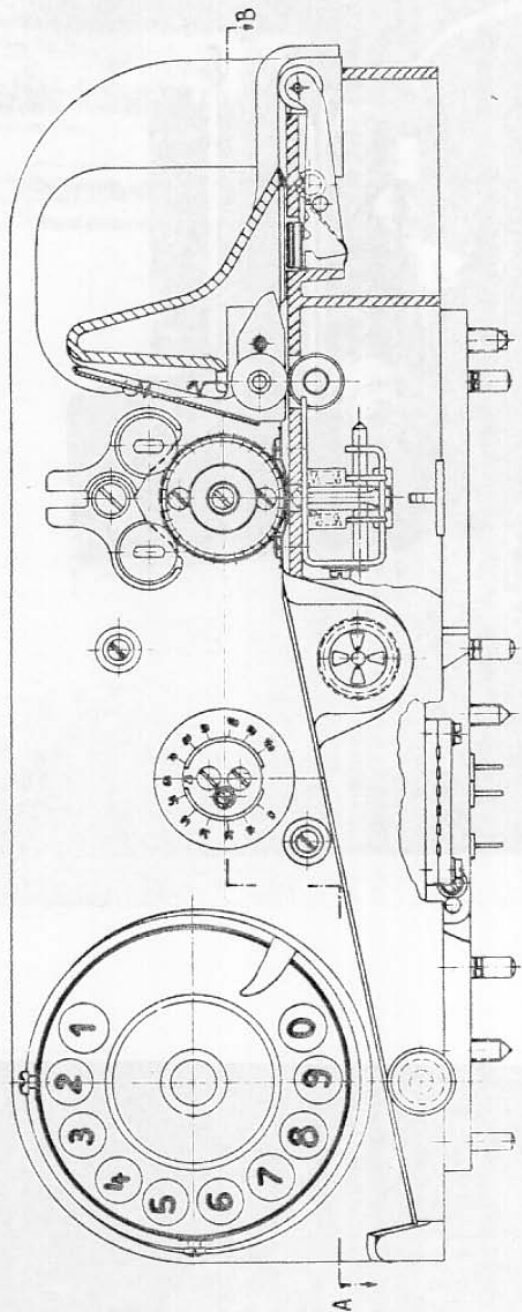


2D

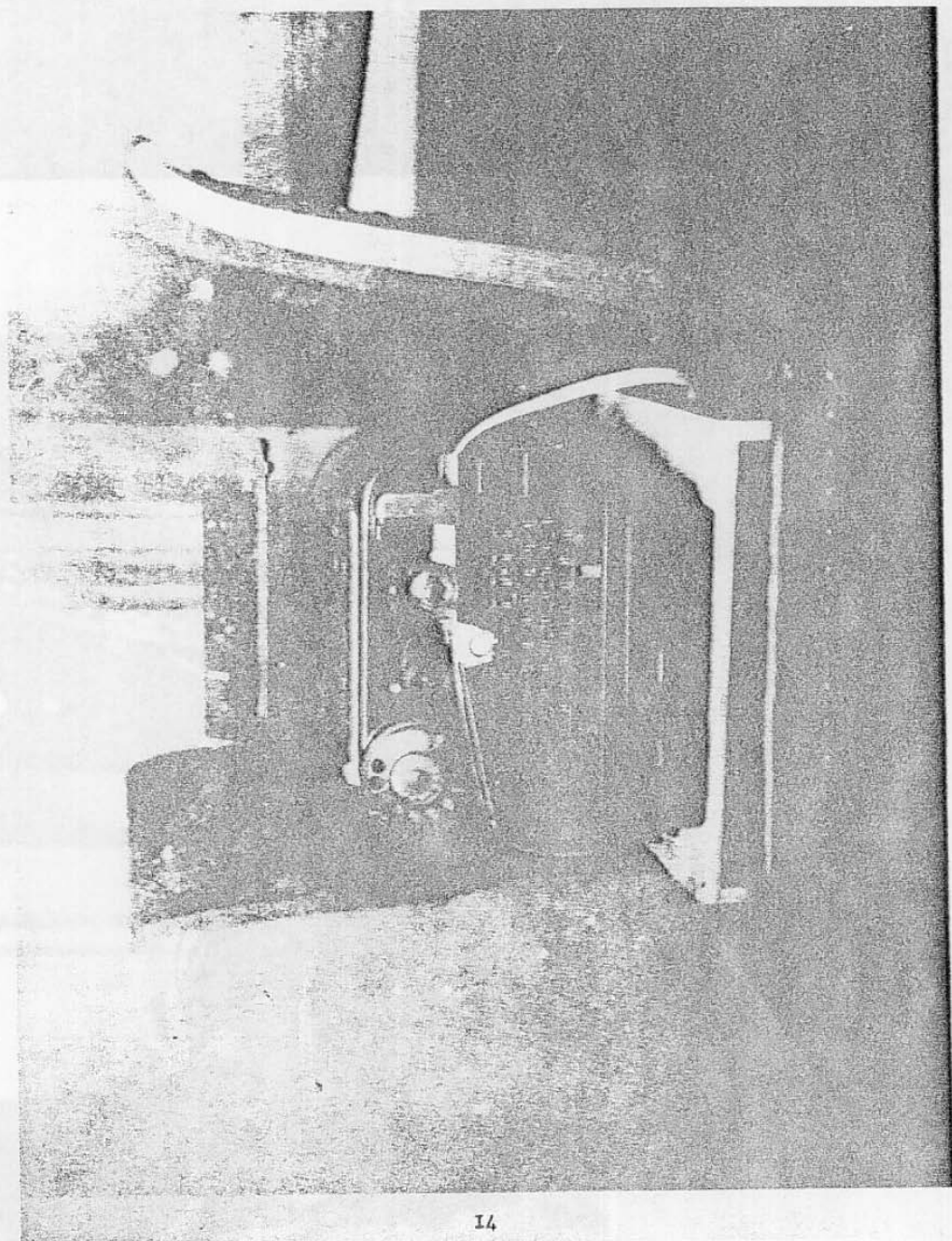
Schnitt L-M

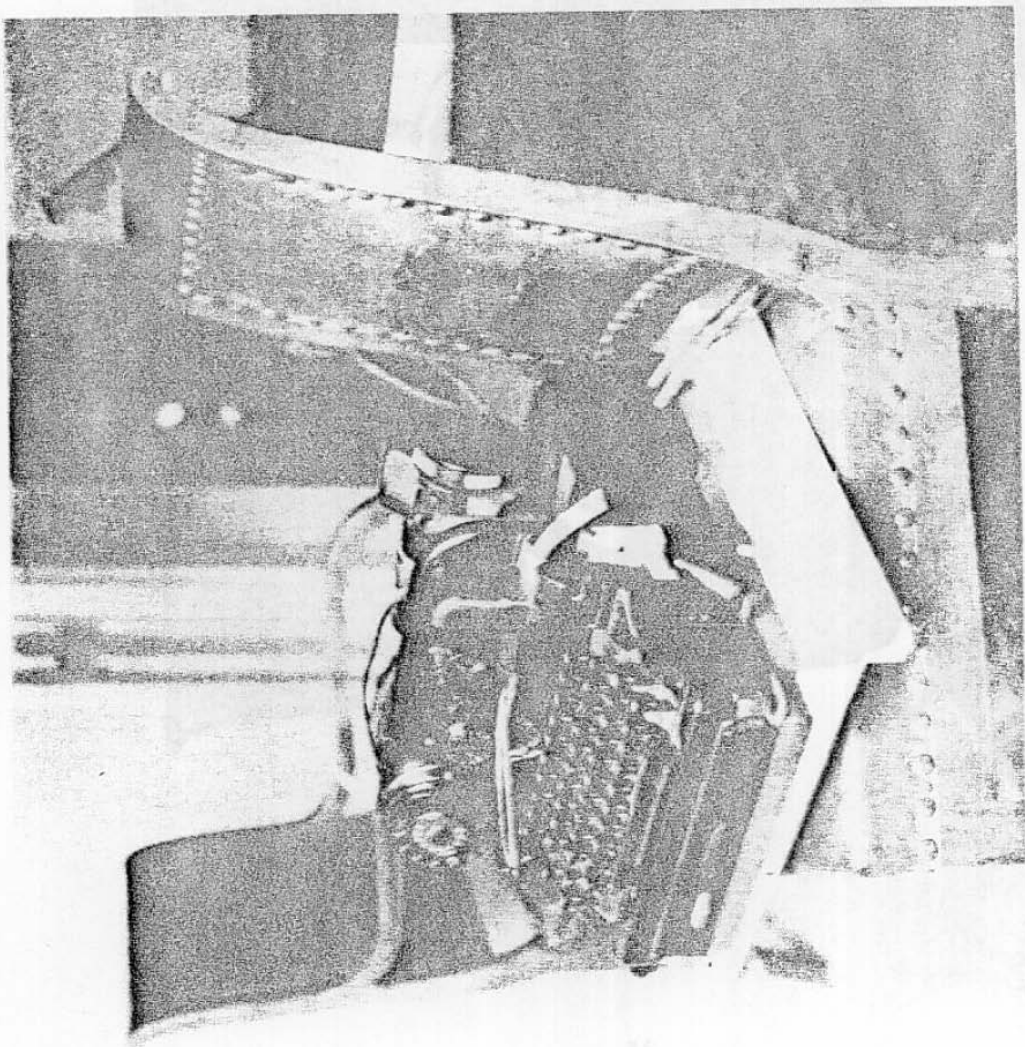


2E



2F







Small A-8

Schnitt A-B

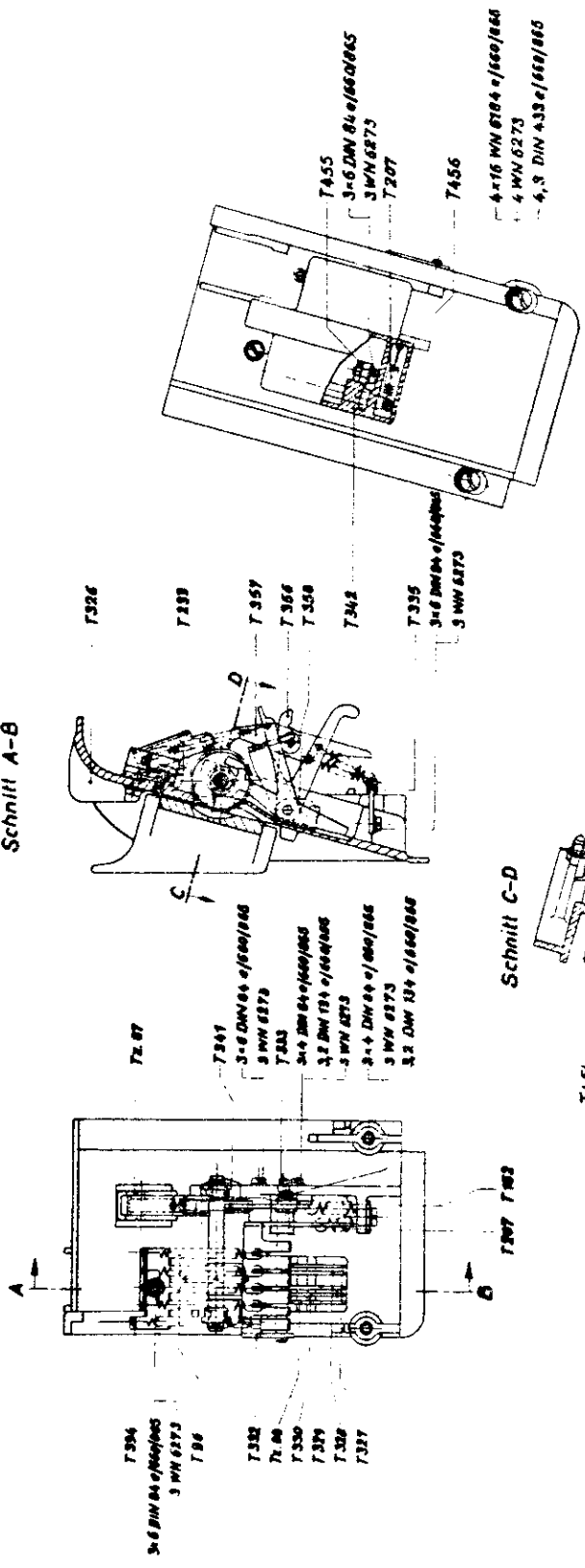
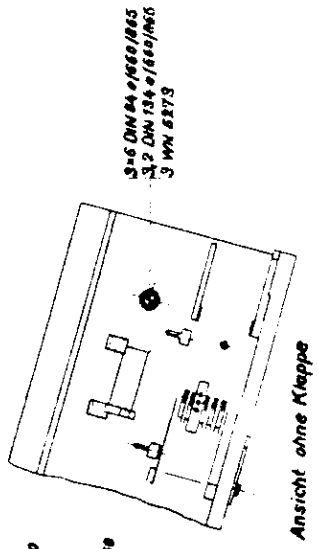
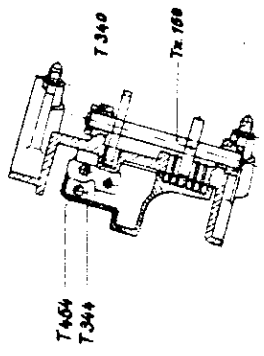


Figure 6

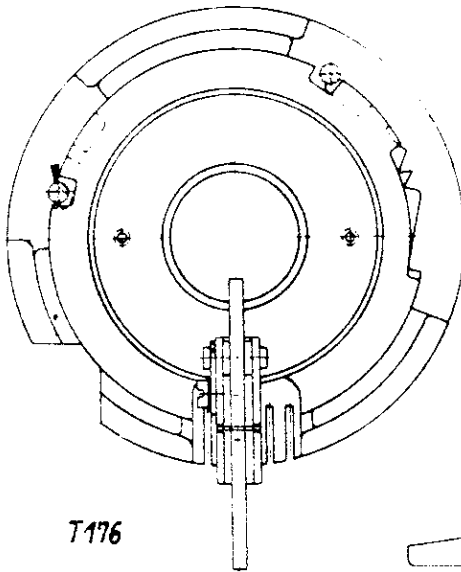


Schnitt C-D

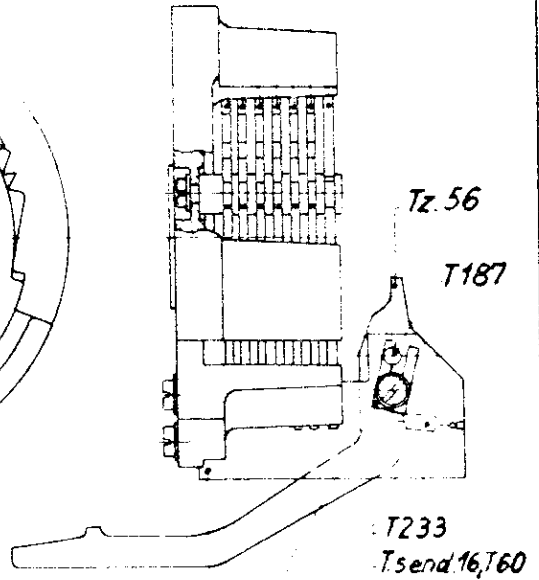


T186 anschließen
 3x 8 DIN 84e/660/865
 3,2 DIN 433e/660/865

T177
 T178
 T179
 T180
 T181
 T182
 T183



T176



Tz. 56
 T187
 T233
 Tsend 16, T60

T188
 3x 4 DIN 84e/660/865
 3 WN 6273

T184
 3x 8 DIN 84e/660/865
 3 WN 6273

Fig. 7

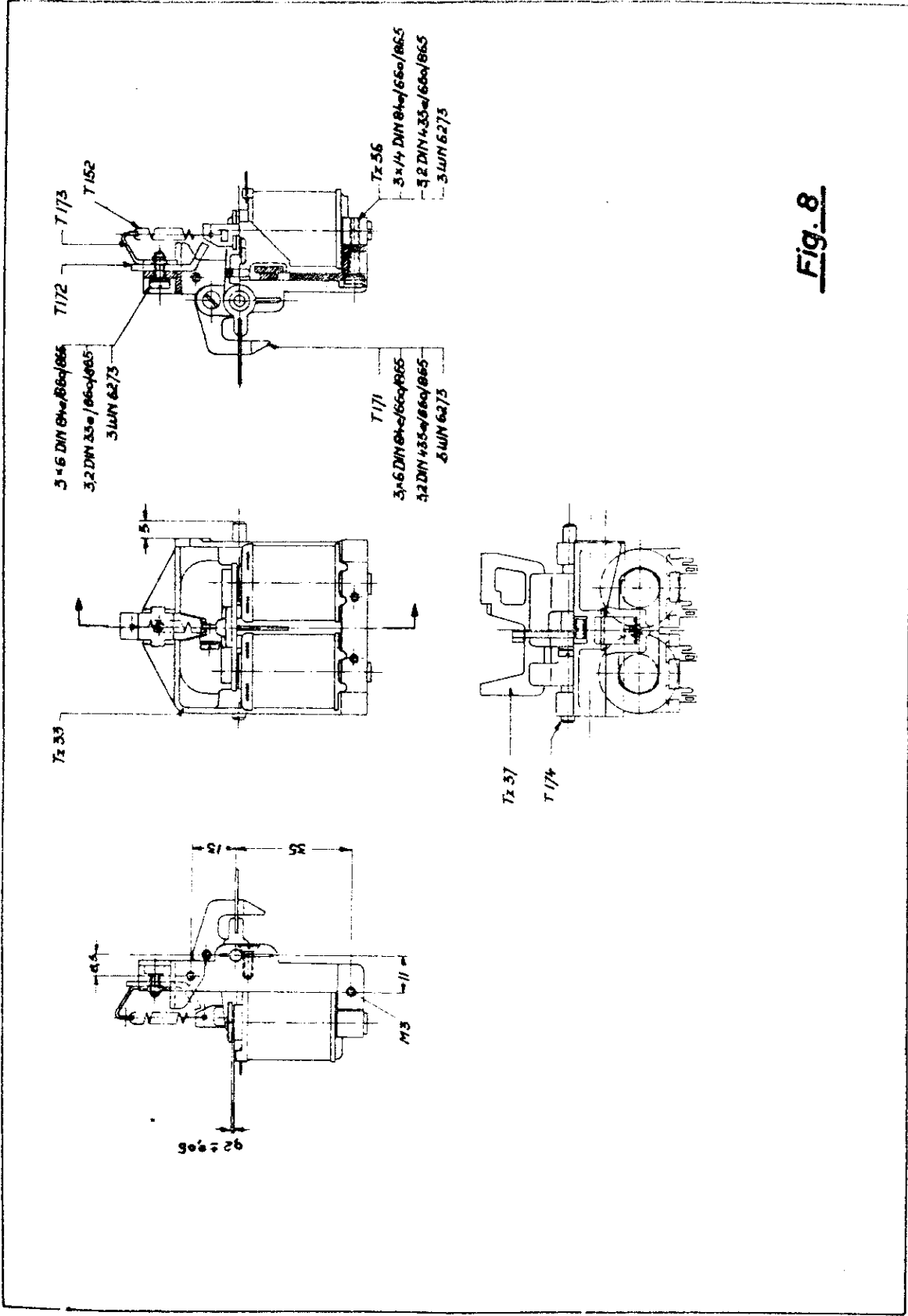


Fig. 8

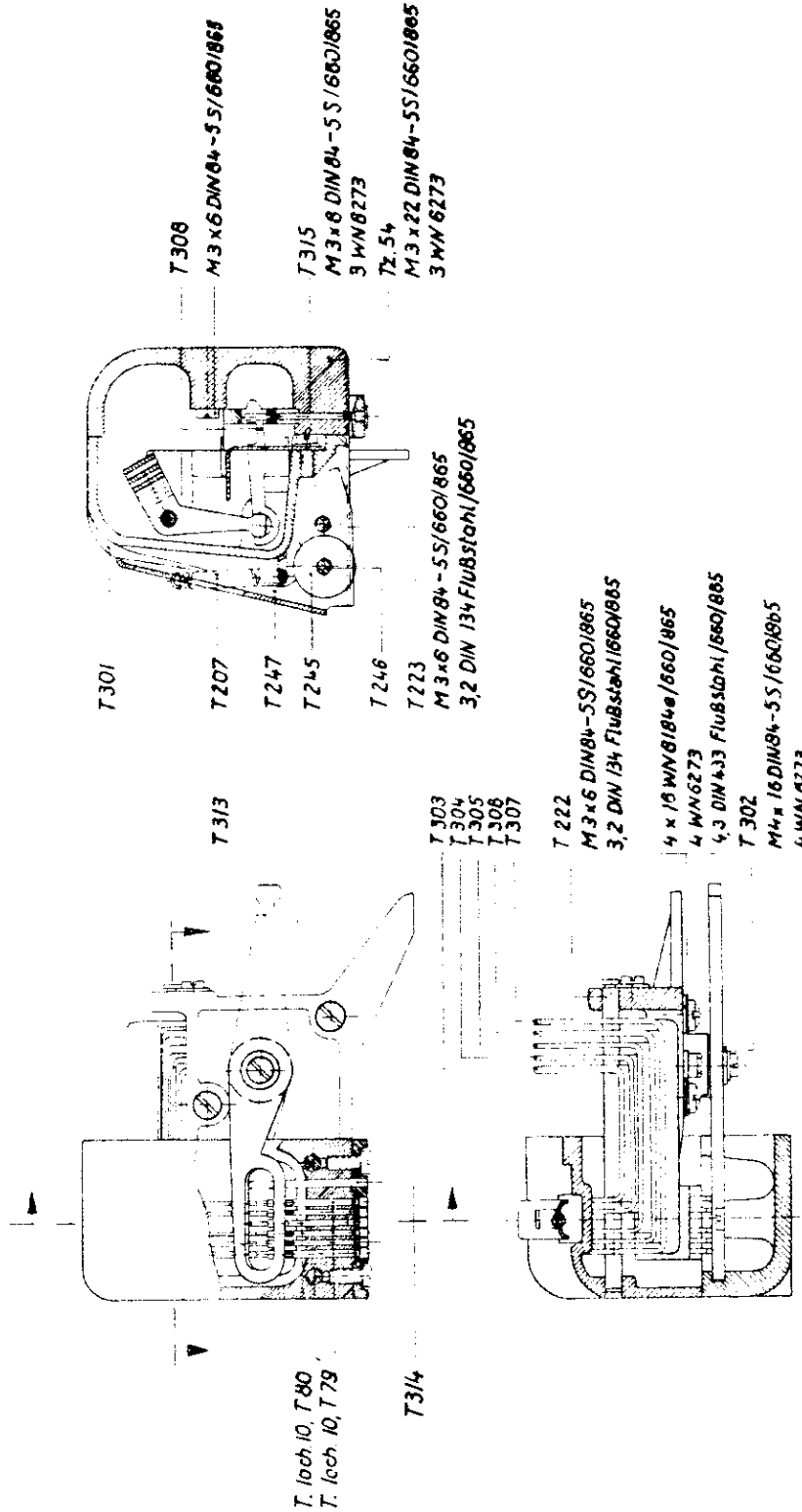


FIG. 9

Empfangslocher

this is a specimen of tape from the siemens halske nr 68 teleprinter

abcdefghijklmnopqrstuvwxyz

Fig. 10