

DESCRIPTION OF OPERATION OF  
 TYPING REPERFORATOR

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switch. The cover encloses both the typing reperforator unit and the base, has a hinged top to permit easy access to the typing reperforator unit to replenish tape and to replace ribbons.

The typing reperforator uses standard perforator tape approximately 11/16" wide. A new method of tape perforating is employed to produce chadless perforations in the tape. The chad, usually severed from the tape, remain attached thereto at their left-hand edges so as to form lids. These lids are stripped from the upper die plate by spring operated stripper pins. The legibility of the printed characters is not impaired by perforation because the lids remain almost flush with the tape. Characters are printed six spaces to the right of their respective perforations.

SIGNAL CODE

The signal code used to operate the typing reperforator is known as the 5 unit code. It consists of 32 arrangements of current and no-current intervals each consisting of five parts. To print a certain character the code combination assigned to that character must be received. Each group of five selecting intervals is preceded by a "start" interval and followed by a "stop" interval used to maintain synchronism between the transmitting and receiving apparatus.

GENERAL

The Model 14 Typing Reperforator is a motor driven mechanism designed to receive messages over wires and to record them on tape in the form of code perforations and printed characters. Messages so recorded are particularly adaptable to telegraph services in which one or more incoming lines terminate at a central point where messages received over these lines may be sorted and retransmitted over one or more outgoing lines. In this type of service the typing reperforator provides perforated tape with messages which can be read without the necessity of deciphering code perforations.

The complete set consists of a typing reperforator unit, base, and cover. The typing reperforator unit (see photographs) consists, essentially, of a motor, a main shaft assembly, a selector mechanism, mechanisms for printing and perforating, a tape feed mechanism, and ribbon feed mechanism. The base includes a tape reel, terminal blocks, and motor

MAIN SHAFT ASSEMBLY

Motion for the setting up of selections and for the performance of all functions is derived from cams mounted on the main shaft. This shaft is driven by a motor through the medium of a pinion and worm gear (Fig. 1). The selector cam assembly is fitted over the end of the main shaft and is driven through the medium of a friction clutch formed by two pairs of steel discs separated by felt washers. The main bail cam (which provides motion for all other functions of the receiving unit except perforating and spacing) and the punch arm cam are assembled in one unit and are driven by a positive clutch comprising a driving member and a driven member. A keyboard spiral gear, located near the bottom of the shaft is used for keyboard operation of the unit.

SELECTING MECHANISM

The selecting mechanism translates the signal line impulses into mechanical motion

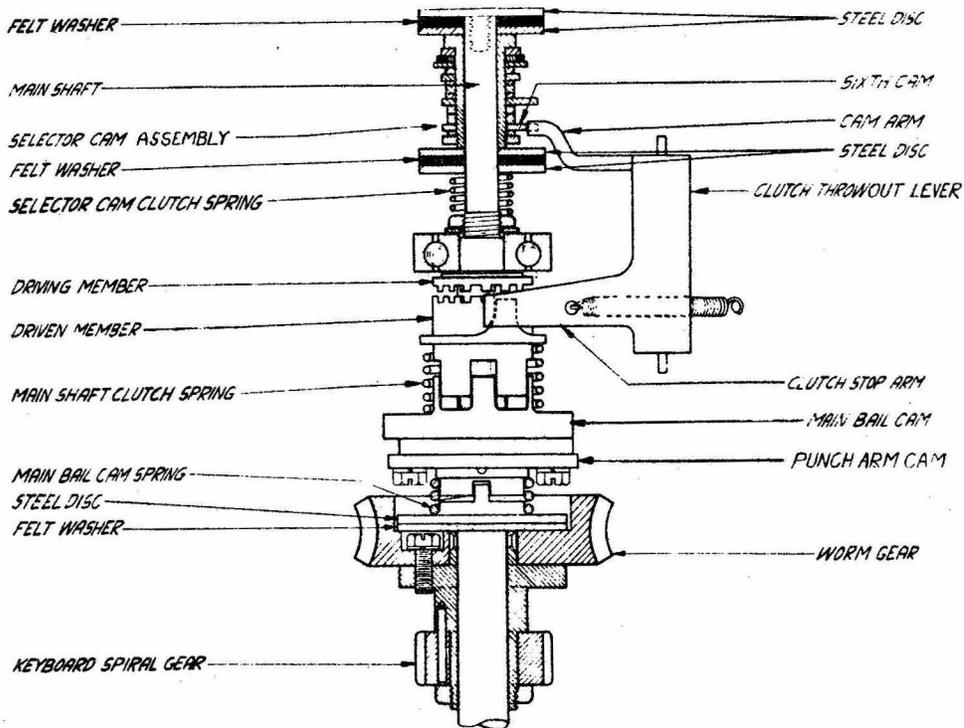


Fig. 1

which causes code bars to be positioned in accordance with the intelligence impulses received during the selecting cycle. This translation is accomplished by the selector magnets which actuate the magnet armature in conjunction with the armature spring. Each selecting cycle is preceded by a no-current, or "start" interval which permits the selector cam assembly to start rotating by releasing its stop arm. The armature spring causes the head of the trip off eccentric screw to depress the trip latch plunger actuating the bell crank and trip latch which unlatches the stop lever.

Each code bar is positioned by a selector cam through the medium of a selector lever, sword, and "T" lever. To illustrate, suppose that a series of impulses corresponding to the code for the letter "E" is to be received: At the beginning of the "start" interval, the armature moves away from the magnet, releasing the stop arm as explained in the preceding paragraph. The selector cam assembly starts to revolve, and the No. 1 selector cam engages the No. 1 selector lever during the time that the first intelligence impulse of the signal is being received. Since the first intelligence interval of the "E" code combination is a current impulse, the magnet armature is attracted, bringing the right-hand end of the armature extension into the path of the right-hand sword arm. As the cam rotates clockwise, it rotates the selector lever counterclockwise causing the sword to strike the right-hand end of the armature extension, rotating

the sword about its pivot point "A." This positions the sword so that when the cam rotates past the tip of the selector lever, the selector lever spring will cause the sword to depress the left end of the "T" lever, moving the No. 1 code bar to the right. Since the No. 2, No. 3, No. 4, and No. 5 intelligence intervals for the "E" selecting cycle are no-current intervals, the magnet armature moves to the released position with the left-hand end of the armature extension in the path of the left-hand sword arm. As the No. 2, No. 3, No. 4, and No. 5 cams operate and release their associated selector levers, the associated code bars either remain in their left-hand position or are moved there by the swords. With the No. 1 code bar to the right and the No. 2, No. 3, No. 4, and No. 5 code bars to the left, there will be a notch in each code bar opposite the "E" pull bar.

#### SELECTOR LOCKING MECHANISM

Provision is made for locking the armature extension during the positioning of each selector sword and unlocking it after the selector cams pass the peaks of their associated selector levers. This is accomplished by a cam operated locking lever which engages a wedge on the armature extension (Fig. 2).

#### CLUTCH THROWOUT LEVER

During the positioning of the No. 5 selector sword, the sixth cam of the selector cam

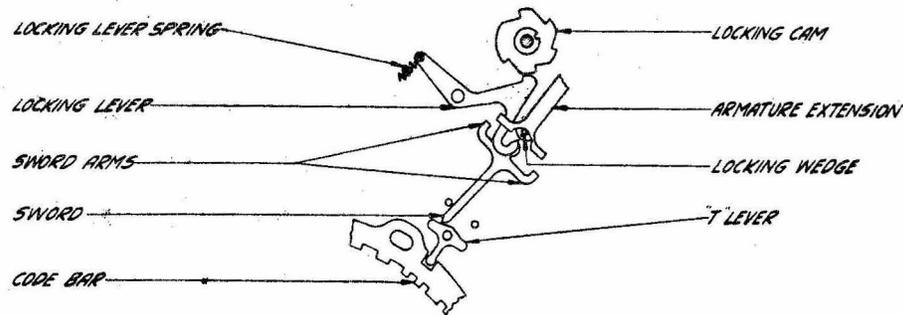


Fig. 2

assembly disengages the clutch stop arm from the driven clutch member (Fig. 1) allowing the main shaft clutch spring to move the clutch members into engagement causing the main bail cam and punch arm cam to rotate. At the end of each revolution, the stop arm of the clutch throwout lever engages the cam surface of the projection on the driven clutch member camming it out of mesh with the driving clutch member. Thus it may be seen that immediately after the completion of a selecting cycle the main bail cam and punch arm cam will be permitted to rotate one revolution to perform the operations required for printing and perforating.

#### PRINTING

The power for the performance of printing and other functions (except perforating

and spacing) is derived from the main bail which is operated by the main bail cam through the medium of a bell crank, lever, and plunger (Fig. 3). In the normal stop position, the bell crank roller is on the high part of its cam as shown in Fig. 3. In this position the bail engages the cam surfaces of the pull bars holding them away from the code bars so that the code bars can be positioned by the selector mechanism. When the main bail cam rotates, the bell crank roller rides down the slope of the main bail cam permitting the main bail spring to raise the bail. As the bail moves upward, the pull bar springs move the pull bars toward the code bars. The unselected pull bars are blocked by the code bars, but the selected pull bar moves into the path set up by the alignment of notches in the code bars

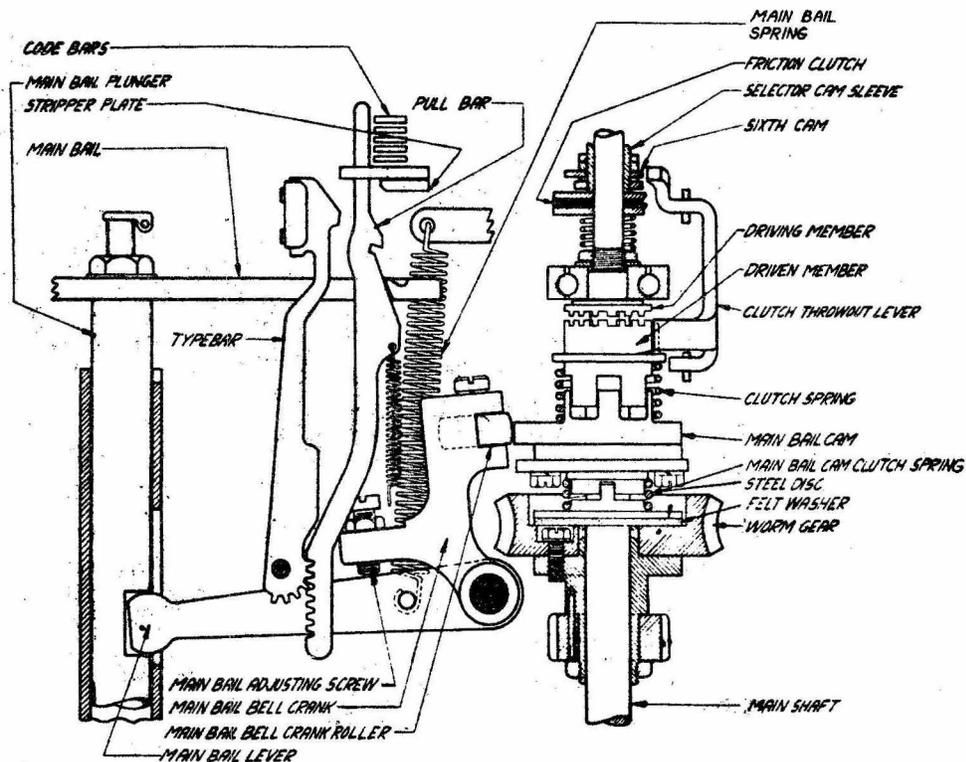


Fig. 3

and a hook like projection on the rear edge of the selected pull bar is engaged by the bail causing it to be raised. The rack and gear connection between the pull bar and type bar causes the type bar to rotate about its pivot toward the platen. As the pull bar is moved upward, the sloping surface of the rear projection on the pull bar strikes a stripper plate causing the pull bar to be disengaged from the bail shortly before the type bar reaches the platen. Momentum carries the type bar the remaining distance to the platen. As the main bail cam continues its rotation it restores the bail and pull bars to their normal stop position. Letter characters are printed near the top of the tape and figure characters are printed near the bottom of the tape.

#### CODE BAR LOCKING LEVER

The code bars are locked in position after each selection by the code bar locking lever located in the extreme right-hand slot of the pull bar guide (Fig. 4). The locking lever is brought into engagement with "V" shaped notches in the code bars by a spring during the early part of the upward stroke of the main bail. It is cammed out of engagement with the notches by the main bail as the main bail nears the end of its downward stroke.

When the code bars are not engaged by the locking lever they are free to be positioned by the selector swords and "T" levers.

#### TAPE PERFORATION

Power for perforating tape is derived from the punch arm cam on the main shaft which actuates the punches by means of the punch bail through the medium of the punch arm casting, punch bail link, and punch selector fingers (Fig. 5). The punch selector fingers are positioned by the punch bell crank springs so that the selection set up in the code bars will be perforated in the tape (Fig. 5). The positioning of the punch selector fingers takes place early in the upward stroke of the main bail. The motion of the code bar locking lever is utilized to operate sensing bell cranks which move toward the code bars with the locking lever (Fig. 4). If a code bar has been positioned to the right, the motion of the associated sensing bell crank will be blocked by the code bar as the code bar locking lever moves toward the code bars, and the punch selector finger will remain in position to engage the punch as shown in Fig. 5. If the code bar has been positioned to the left, the sensing bell crank will be free to follow the code bar locking lever, and the train of linkage between the sensing bell crank and the

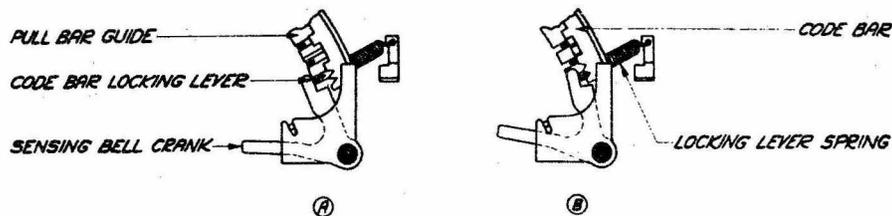


Fig. 4

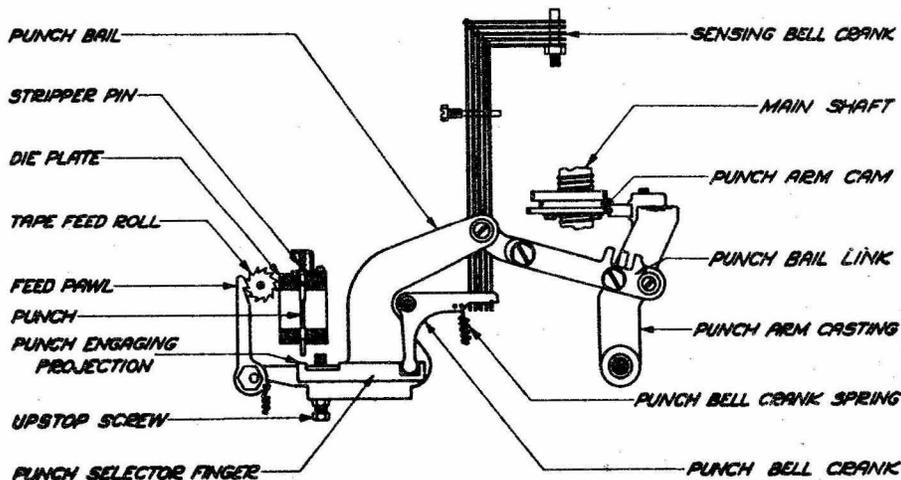


Fig. 5

punch bell crank will allow the punch bell crank spring to rotate the punch bell crank clockwise, thus moving the punch selector finger to the left so its recess will be under the punch.

Shortly after the punch selector fingers have been positioned, the punch arm cam rotates the punch bail through the medium of the punch arm casting and the punch bail link. As the punch bail rotates, the punch engaging projections of the selector fingers which are in line with the punches, raise the punches and perforate the tape. A projection on the punch bail engages the feed punch during every operation. An upstop screw in the punch bail limits overtravel of the punches to prevent mutilation of the tape.

### SPACING

Tape is spaced by rotating the feed roll which has pins on its periphery that engage feed perforations in the tape (Fig. 6). The tape is held in engagement with the feed roll by the tape tension lever. The feed pawl attached to the punch bail, is held in engagement with the feed roll ratchet by a spring and rotates the feed roll by engaging a tooth of the feed roll ratchet during each downward

stroke of the punch bail (Fig. 5). The feed roll detent insures even spacing of the perforations.

### OVERLAP

In summarizing the selecting, printing, and perforating operations described in the foregoing, it should be noted that the selecting cycle is followed immediately by the operating cycle. Near the end of the selecting cam cylinder revolution, the sixth cam trips the clutch throwout lever allowing the main bail cam and punch arm cam to make one revolution. Thus it may be seen that the performance of any function requires time equivalent to both a selecting and an operating cycle. However, the selection of the next character may be made at the same time that the function performance of the previous function is taking place. This arrangement is known as overlap and is used to facilitate printer operation at high speeds. Without this feature it would be necessary to allow time for operation after each selection.

### RIBBON FEEDING

The ribbon feed lever is operated by an indent in the main bail plunger. Attached to the upper end of the ribbon feed lever is the

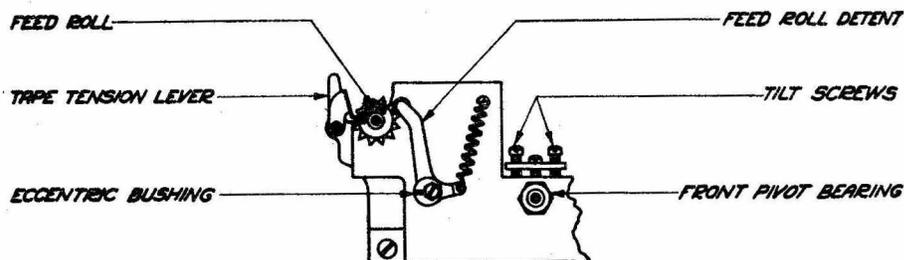


Fig. 6

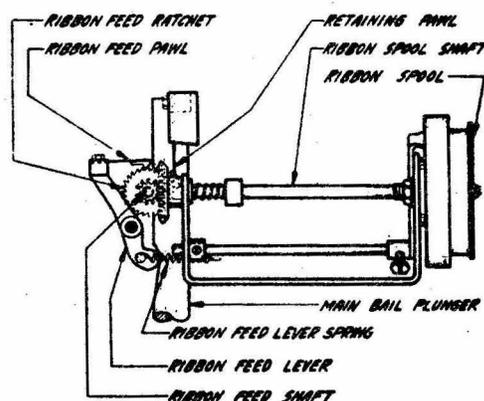


Fig. 7

ribbon feed pawl which engages with the teeth on the ribbon feed ratchet. With each operation of the main bail, the ratchet is rotated a slight amount. This motion is carried through either one of two bevel gears on the ribbon spool shafts, causing one of the ribbon spools to be revolved (Fig. 7).

#### RIBBON REVERSE

Assuming that the ribbon is being wound on the left-hand spool and is almost unwound from the right-hand spool, an eyelet which is fastened to the ribbon will engage and move the right-hand ribbon reverse arm. This arm moves the right-hand ribbon reverse pawl into the path of the ribbon reverse bail (Fig. 8). As the bail moves downward it engages the pawl moving the ribbon feed shaft to the right (Fig. 9). This will disengage the left-hand ribbon feed bevel gears and engage the right-hand gears. The ribbon will then be wound on the right-hand spool. The reversing operation takes place in a similar manner on the left-hand side of the assembly when the eyelet near

the left end of the ribbon engages with the left-hand ribbon reverse arm.

#### UPPER AND LOWER CASE SHIFT MECHANISM

The platen consists of a circular disc of synthetic rubber about  $1/4$ " in diameter mounted on a cylindrical steel rod of the same diameter about  $1/2$ " long. This assembly fits into a well in the platen block which is mounted so that it can be shifted back and forth on the platen shaft beneath the tape (Fig. 10).

To print figures when the platen is in the "letters" position, the "figures" pull bar is selected. As the main bail moves upward it raises the "figures" pull bar and a horizontal projection at its lower extremity, unlatches the shift lever from the shift bell crank on the platen shaft allowing the platen shift spring to move the platen block to the "figures" (forward) position. In this position

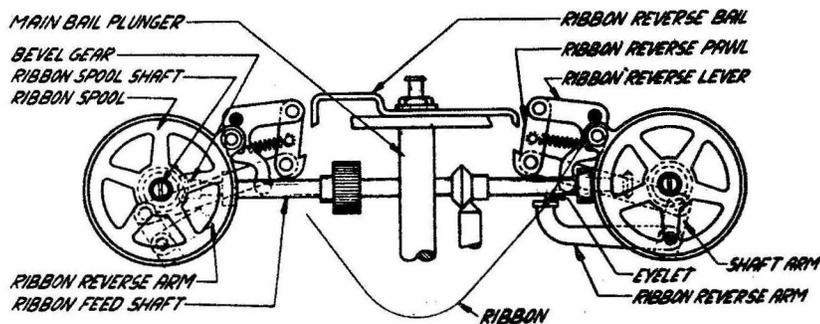


Fig. 8

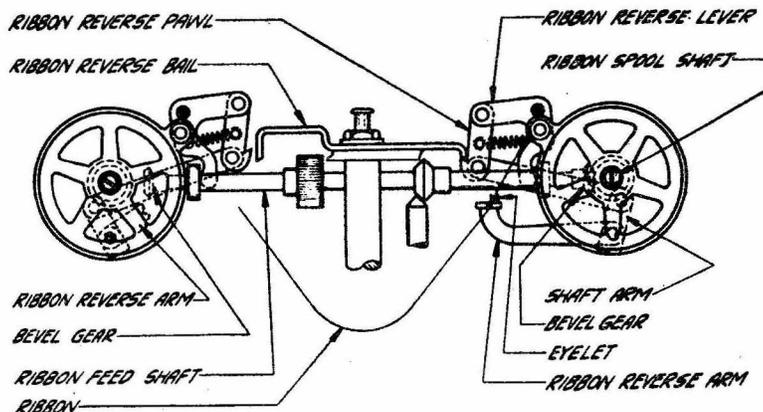


Fig. 9

the platen will support the tape opposite the figures on the type pallets.

When the "letters" or "space" pull bar is raised by the main bail, an extension on the pull bar engages the left-hand arm of the shift rocker lever moving the rear extension of the shift rocker arm downward. The shift rocker rotates about its pivot and the upper notched end is moved toward the rear, moving the platen block with it through the medium of the shift bell crank and the platen shaft. The shift lever latches the shift bell crank when the platen reaches the "letters" position.

#### BACK SPACER

Certain typing reperforators are equipped with a back spacing mechanism. This mechanism is operated by means of two levers located at the front of the typing unit near the platen mechanism. These levers may be operated either singly or together by the fingers of one hand. One of these levers backs the tape one character for each operation and the other lifts the ribbon guide and ribbon away from the tape permitting the operator to see the normally covered typing on the tape. The levers are located inside the cover and the lid must be raised to operate them. The mechanism is capable of back spacing about 70 characters.

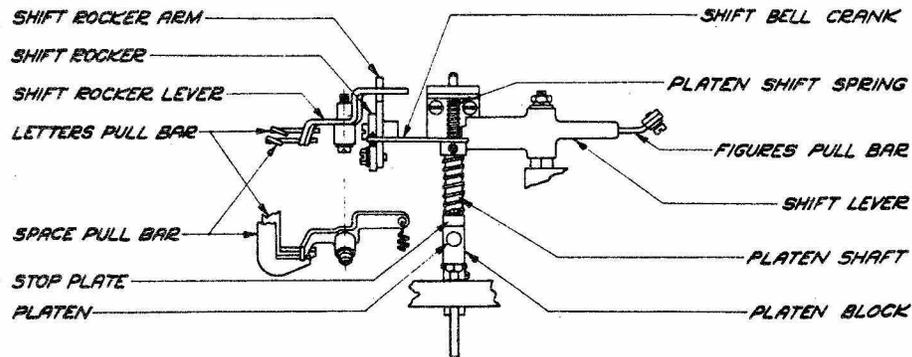
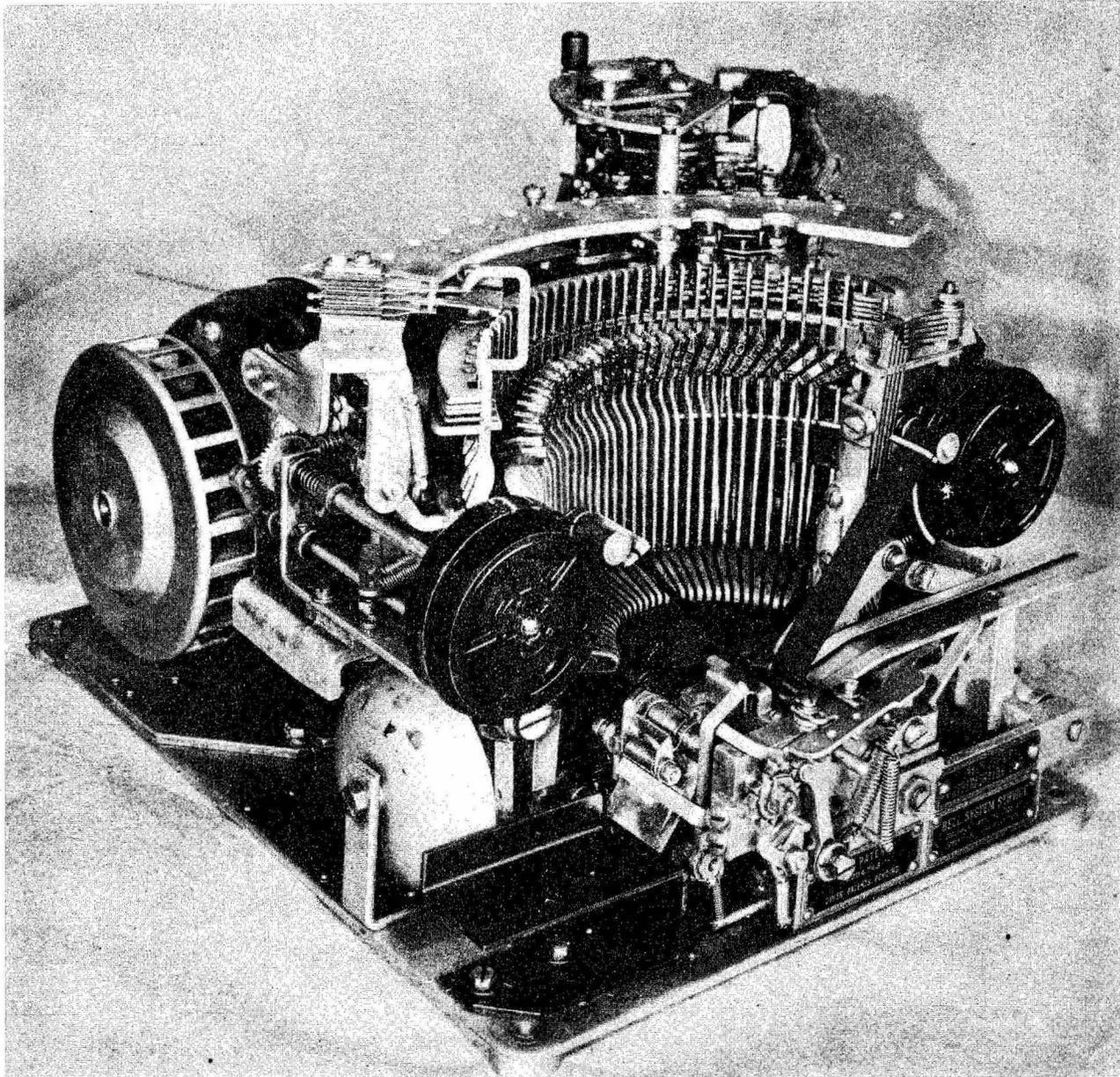
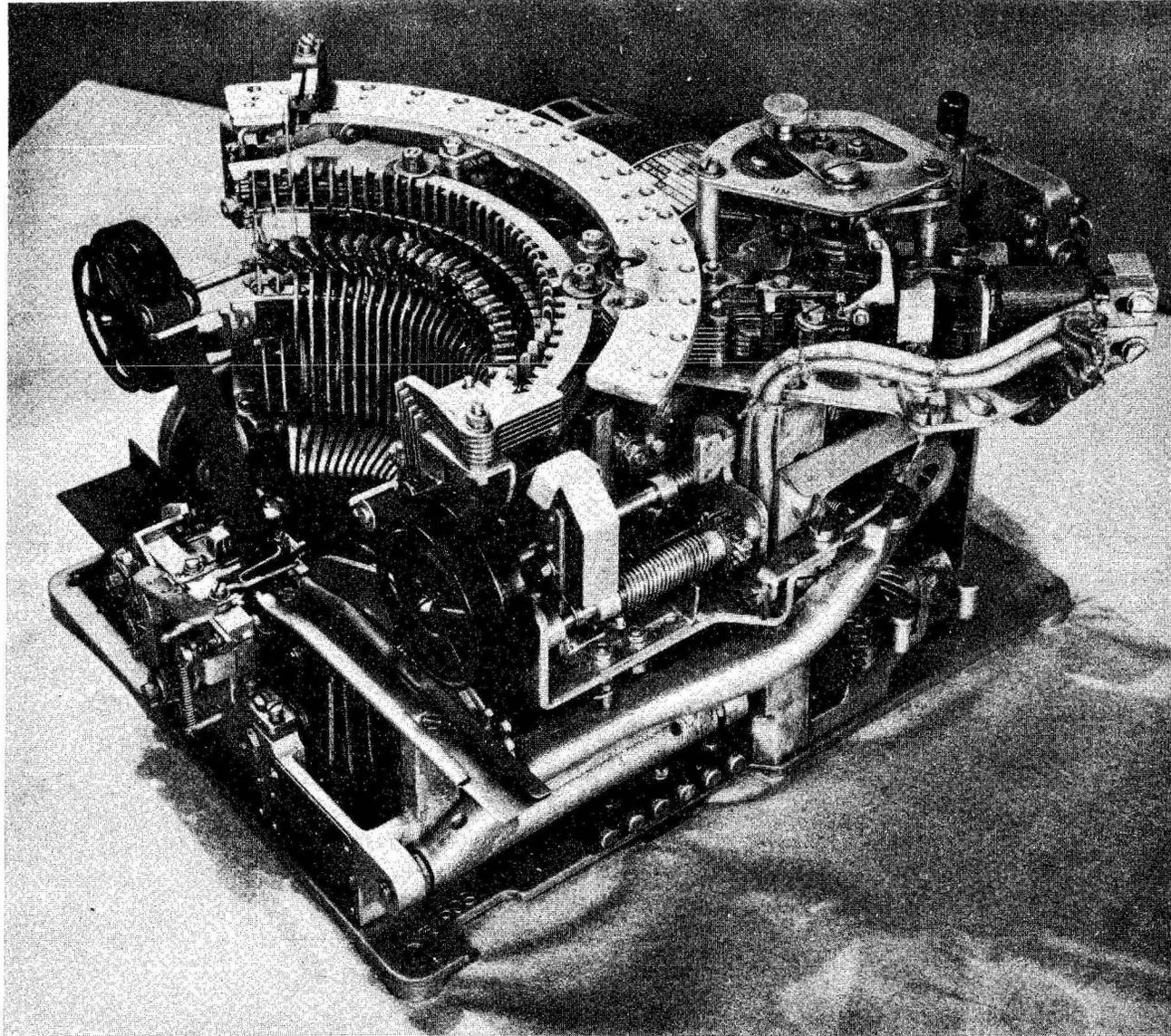


Fig. 10

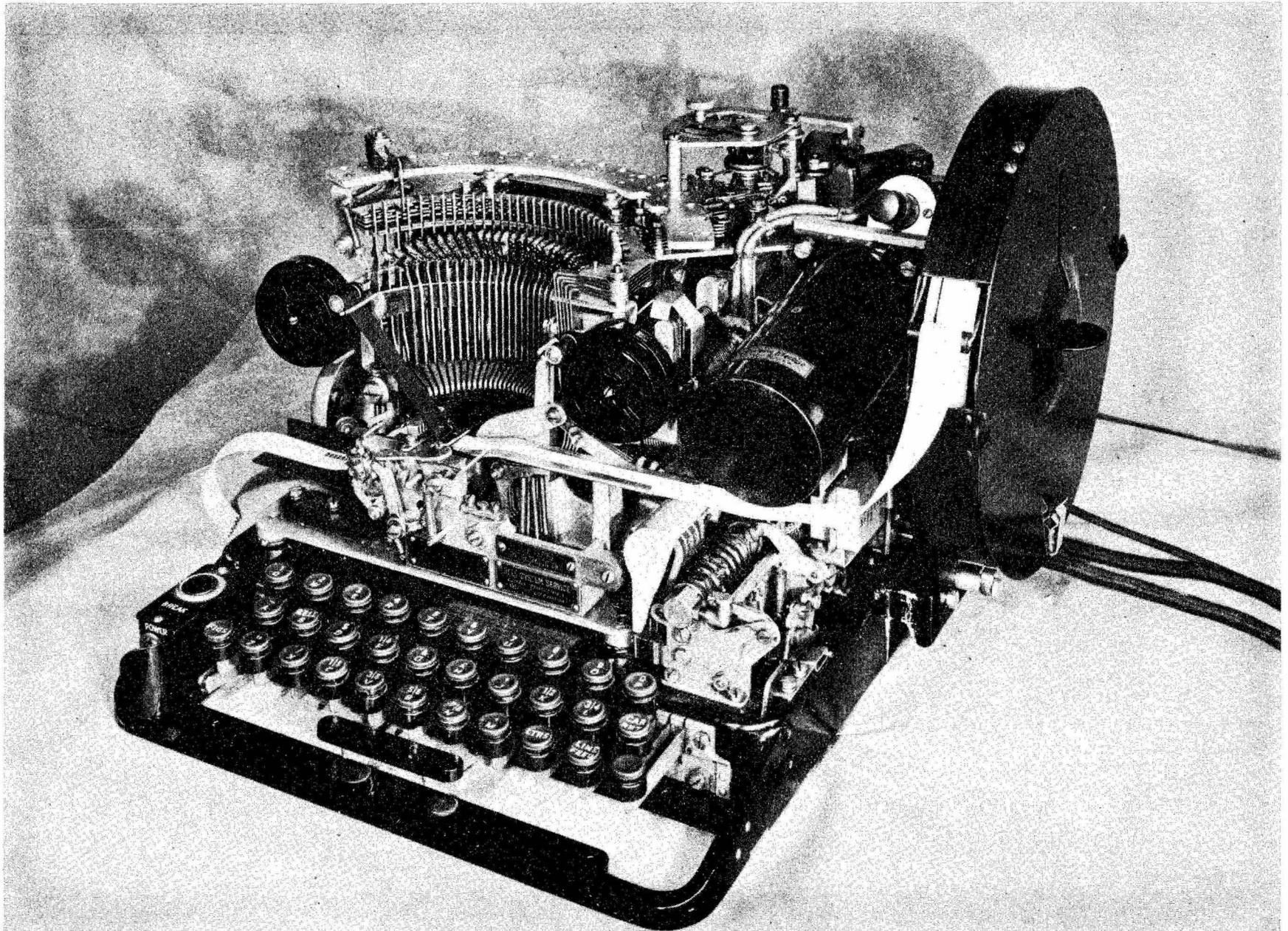
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4 Photographs



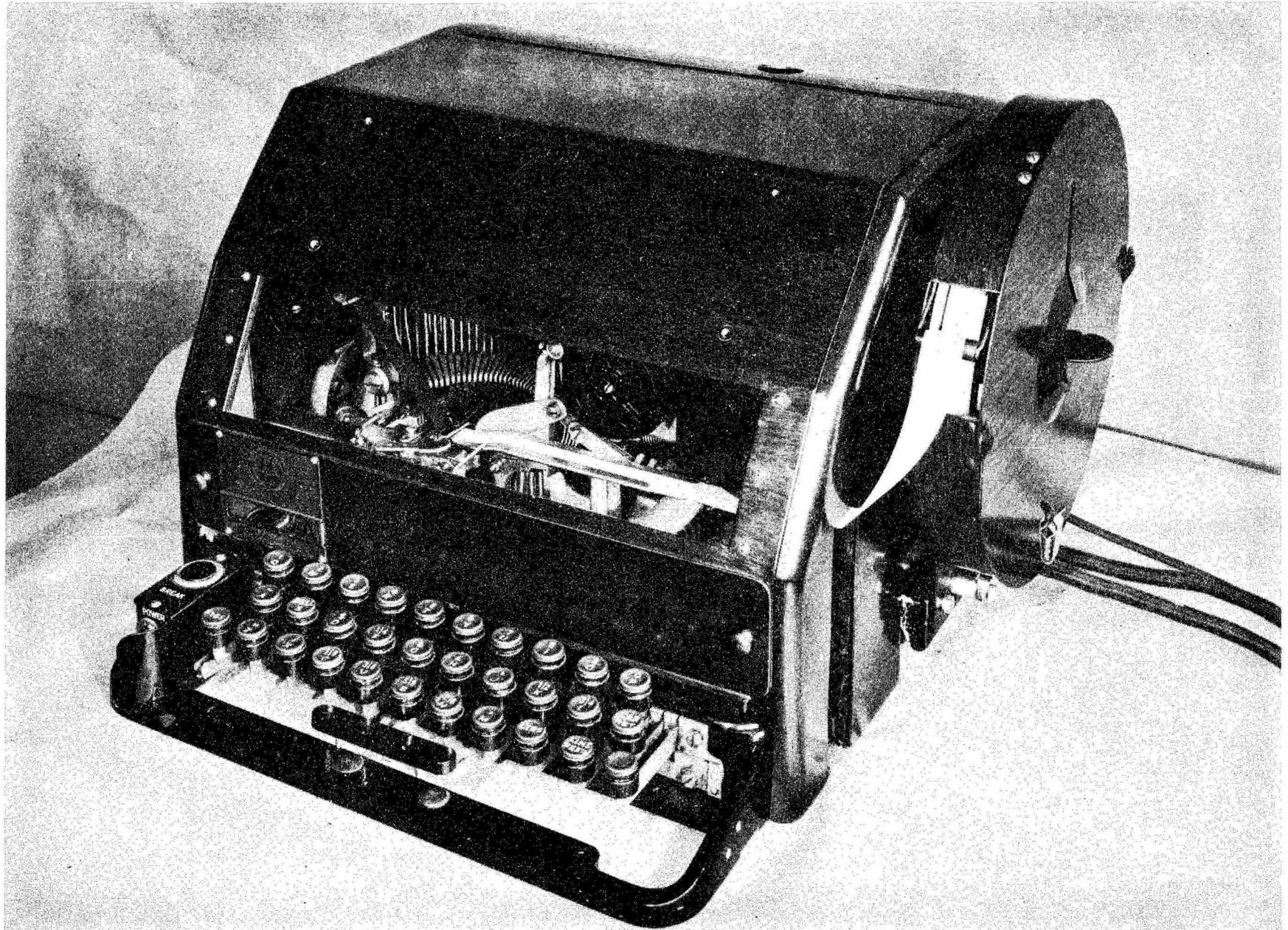
RECEIVING ONLY TYPING REPERFORATOR  
(FRONT)



RECEIVING ONLY TYPING REPERFORATOR  
(SIDE)



SENDING - RECEIVING TYPING REPERFORATOR  
(COVER REMOVED)



**SENDING - RECEIVING TYPING REPERFORATOR  
(COVER IN PLACE)**