

PREVENTIVE }
MAINTENANCE }

Alphabetical
Printing Punch
Type 036

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PREVENTIVE MAINTENANCE

Alphabetical Printing Punch, Type 036

CHARACTER OPERATING BAR MECHANISM

I. Cleaning

All dust and dirt should be brushed out of the keys and from other parts of the machine.

II. Inspection

1. Punch Bails should be free on their pivots with a minimum of end-shake. This can be adjusted by the pivot screws with lock nuts on the right-hand side frame. Be sure lock nuts are tightened.
2. Operating Bar Stop for wear and adjustment.
3. Reamer Shaft for nicked or worn flutes and proper speed. It is important that the proper speed be maintained on any printing punch. Increasing the speed of the reamer shaft will not necessarily speed up the operation; in fact, it may decrease the speed of operation and may be the cause of "galloping". The reason for this is that the time required for one reamer hook operation plus the unlatching of the next reamer hook may be just sufficient to permit a flute on the reamer shaft to go by if the reamer shaft is too fast. If this occurs, it is necessary for the newly unlatched reamer hook to "wait" for a flute, thus delaying the operation.
4. Reamer Hooks for wear and freedom of operation. The hook must be free on its pivot and must not bind in the comb.
5. Key Lever Upper Stop for wear and adjustment.
6. Interlock Assembly for freedom of operation and adjustment. The key interlock assembly may be the cause of sluggish or improper key operation. It should first be determined that the comb is clean and free of burrs or binds. If gummy, it may be washed with a cleaning fluid to which oil has been added and then the parts should be wiped with a clean, dry cloth. *Oil should never be put into the interlocks.* If any comb teeth are bent, they obviously will obstruct the free movement of the keys or the interlock discs. Any bent teeth should be straightened and the inside surface of the comb should be smoothed with a fine stone. It is well to run a flexstone between the teeth to remove burrs. The channel of the disc guide should likewise be free of burrs and binds.
7. Star Wheel for adjustment on both punching and spacing operation.
8. Contacts. Key interlock, punch bail, eject key and tab key for dirty points and proper adjustment.
9. Tab and Eject Key Solenoids for freedom of operation and proper adjustment.

III. Lubrication

Under no condition should oil ever be put into the key interlock assembly.

IBM 6

- (1) Reamer hook pivots.

IBM 9

- (1) Bail pivots.
- (2) Oil cups in reamer shaft bearings.
- (3) Operating bar guide combs, front and rear.

VACUUM PUMPS AND DRIVE HOUSING

I. Cleaning

All dust and dirt should be brushed from around unit. The pump solenoid plunger should operate freely. Wash it with cleaning fluid, if gummy.

II. Inspection

1. Control Valves (on early type machines only) for proper tabbing and for leaks.

A check should be made to see that the rack will tab properly on a short skip (10 columns) on either end of the rack and should also be checked for a long skip on either end (approximately 40 columns). If it is found that the rack speed is too great on short skips, particularly on the column 1 end, it will be found that backing off the permanent by-pass valve adjusting screw will improve this condition. The backing off of this screw causes a reduction of the vacuum in the carriage cylinder while the rack is standing idle. Thus the carriage does not move at an excess speed at the beginning of a tab operation. This action is more prevalent when tabbing on the left end of the card due to the larger evacuated area in the right end of the cylinder.

If sufficient speed cannot be obtained in either the forward or reverse movement of the carriage, it is likely that leakage is occurring in the system. The most common source of leakage is the by-pass valves which can be checked by disconnecting the tubing and shunting the by-pass valve casting by means of rubber tubing. When connected in this manner, excess speed of the rack should be obtained providing the pump is producing enough vacuum. It is seldom found that the pump will not produce sufficient vacuum, and it is therefore advisable to check thoroughly for leakage elsewhere before dismantling the pump.

2. Piston for sliding freely on shaft.

Check to be certain that the piston slides freely in the cylinder with both ends of the tube open. This will indicate that there are no mechanical binds in the assembly.

In a few instances trouble has been experienced because the plug in the center of the piston has moved to the right or left, closing one of the ports to the cylinder. If this trouble is present, it will be indicated by the fact that the cylinder does not slide freely on the tube when both ends of the tube are open. The "feel" of recoil due to compression in this case will distinguish it from mechanical friction or a bind. It will be necessary to replace the tube and cylinder if this condition occurs.

3. Oil Reservoir for proper oil level.
4. Drive Housing for wear and proper oil level.

III. Lubrication

IBM 15

- (1) Oil pump drive housing.

IBM 16

- (1) Oil reservoir should be not over one-half full when machine is running.

IBM 17

- (1) Main drive shaft gear teeth.

IBM 21

- (1) Ball bearing race behind drive pulley.

RACK CONTROL MECHANISM

I. Cleaning

The rack should be cleaned thoroughly with a stiff brush dipped in cleaning fluid. Any dust in the tab control assembly should be cleaned out.

II. Inspection

1. Racks for freedom of operation. Before attempting to make any adjustments of the rack, a check should be made to insure that both the main rack and the duplicating rack operate freely when moved by hand. These may be individually checked by raising the duplicating card bed.

2. Rebound Check Lock for wear and correct operation. The stop pin should hold the rebound check pawl in a vertical position when the back space lever is operated, or when the rebound check solenoid is operated.

Remove the rebound check rod by taking off the nut on one end and sliding it out above the card hopper. Examine this rod for a smooth and polished finish. If it does not have this finish or shows any signs of wear or crookedness, it should be replaced.

Remove the rebound check pawl. The edges of the hole should not be worn. They should be square and sharp but without burrs.

After replacing these parts, a check should be made to see that the rack is positively locked against a reverse or rebound movement. Check further to be sure that the rack operates freely in a forward direction.

When the solenoid plunger is fully attracted, the rebound check pawl should be just pulled up firmly against its stop pin.

3. Back Space Mechanism for proper operation.
4. Dog and Escapement Mechanism for wear and proper adjustment.
5. Tabulating Mechanism for freedom of operation and proper adjustment. Insert #6 tab stop in a predetermined column. With power on machine, hold rack and depress tab key, allowing the rack to move over slowly until the tab stop just touches to tab-break contact operating arm. At this time the dog lifter should allow the dog to drop in the proper tooth, with approximately $\frac{1}{16}$ " overlap. The dog lifter arm has to be bent to obtain this adjustment.
6. Tab Break Contact Operating Arm for freedom of operation.
7. Tab Break Contact for dirty points and proper adjustment. It should break with $\frac{1}{32}$ " air gap after the dog has dropped in the proper tooth in the rack and the rack has taken up the rest of the movement of the dog.

8. Tab Control Contact Assembly

Check the contact operating levers to see that they do not bind. Be sure the screws which hold the contact assemblies are tight.

The normally open contacts should have .022" air gap and the normally closed contacts must have good tension.

Check with inserts 1 through 5 in tab rack and space the rack so that each insert operates the contacts. See that the N/O contacts are closed with good tension, and the N/C contacts are opened approximately .022".

9. Card Registration
10. First Column and 80th Column Contacts for dirty points and proper adjustment.

III. Lubrication

IBM 6

- (1) Rack cylinder and piston.
- (2) Dog and escapement mechanism pivots.

FEED, PUNCH AND PRINTING MECHANISM

I. Cleaning

All dust and dirt should be brushed from the feed and from around the roller throat. It is important that the feed knife block be clean and smooth in order to slide freely. The slide rods also must be smooth and should have a polished surface so that the knife slides freely and quickly. The solenoid plungers should operate freely. Wash them with cleaning fluid, if gummy.

Type should be brushed clean or cleaned with plastic type cleaner, part number 450528.

II. Inspection

1. Clutch Solenoid for freedom of operation and proper adjustments.
2. Pump Solenoid for freedom of operation and proper adjustments.
3. Feed Knife for proper adjustments.
4. Card Pusher Link for binds.
5. Roller Throat for proper adjustment.
6. Die and Guide Block Assembly for clearance between the top of the die and the type head. If this clearance is too small, the effect may be that the type heads strike on top of the die, causing it to collapse into the 12 hole. This may be due to the fact that the die is too high. If the top of the die is more than $\frac{1}{32}$ " above the 12 hole, it should be filed down to $\frac{1}{32}$ ".
To measure this distance, insert a card into punching position and punch a 12 hole. Using a small knife blade, scribe a fine line on the card even with the top of the die. The card can then be removed and the distance measured from the top of the hole to the line.
7. Punches for freedom of operation and proper travel. It is very important that all punches slide freely in the punch guide block and into the die. If it is necessary to stone the punches to free them, use the fine side of a clean, flat stone. Obviously, if too much stoning is done, the punched holes will be ragged. It should be possible to slide each punch into its place by hand and without binding until only the recessed driving portion of the punch projects from the rear of the guide block.
The punch travel can readily be measured with a steel scale by putting a straight edge across the back casting of the machine and measuring from the straight edge to the rear of the punch. Measure the distance in the rest position. Then depress a key and turn the machine by hand until the tip of the punch just projects from the front of the guide block and measure again. The difference between the two measurements will indicate the amount of travel of the punch before projecting from the front of the punch guide block.
The tip of the punch can readily be seen when it begins to project from the front of the guide block by sighting along the card line from near the feed knife and placing a white card or a light on the other side of the die.
8. Ribbon Spacing. Check operation of ribbon feed mechanism by manually operating machine. The ratchet operating pawls should have the same amount of travel after engaging their feed ratchets so that the two ratchets are operated the same distance. This can be observed from the rear of the machine by moving the carriage first to one end, then to the other. Check while operating the machine by hand. The ribbon feed operating fork should not bind at either end of the stroke.
9. Type for printing squarely and in registration.
10. Duplicating Mechanism
 - (a) **DUPLICATING SOLENOIDS** for freedom of operation and proper adjustment.
 - (b) **BRUSHES** for wear, damage and projection.

- (c) CONTACT ROLL for clearance to brush separator and centering of brushes to roll. For a method of checking alignment of brushes to center of roll, see 016-031 section under Duplicating Unit.
- (d) MASTER CARD CARRIERS for proper registration. Be certain the card used for checking is in perfect registration.

III. Lubrication

IBM 6

- (1) The master rack guide bar. This should immediately be removed with a cloth so that only a very thin film remains to protect the rod from rusting. Excess oil at this point will eventually result in sluggish rack operation.
- (2) Each punch where it enters the guides. However, the punches should be perfectly free before oiling.
- (3) Duplicating brush holder assembly pivots.
- (4) Ribbon spacing bell crank pivots.
- (5) Ribbon spacing ratchet wheel pivots.
- (6) Feed knife operating mechanism pivots.
- (7) Roller throat.

IBM 9

- (1) Pivots at the top and bottom of the punch connecting links as well as the striker arm bearings.
- (2) Card feed drive shafts bearings.

IBM 17

- (1) Card feed drive gears.

BASE

I. Cleaning

The entire base should be wiped down with a rag soaked in cleaning fluid. Any card punch chips should be brushed out of the machine. Any oil or dirt on the relay points should be washed out.

II. Inspection

- 1. Motor and Generator (see *General Section*)
- 2. Duo Relays (see *General Section*)
- 3. Sentinel Switch (see *General Section*)

IBM 6

- (1) Oil cups of drive motor and generator.
- (2) Pivot points of duo relays.

IBM 17

- (1) Sentinel switch contact points.