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Lexmark® Optra® M410/M412
Remanufacturing Instructions

Optra® M412

Optra® M410

About the Cartridges

In September 1999, Lexmark® introduced the 12ppm Optra® M410 as a replacement for the Fujitsu®-based Optra K 1220. Then, in May of 2000, the M412 was introduced as the first sub-$800 17ppm monochrome laser printer with both USB and PostScript emulation standard.

Both printers ranged in print speed from 12-24 pages, with a maximum resolution of 1200 dpi. Cartridges for the two were essentially the same, with the M412 being backward compatible to the M410. Neither the M410 nor M412 were compatible with any other Lexmark products.

The M412 cartridges (a 15,000 page replacement and a 5,000 page starter cartridge) have replaced the M410 cartridges.

Key Points

- The PCR is not located in the cartridge, but instead is built into the printer. The PCR is a maintenance item for the printer that is replaced every 90,000 pages by the end user.
- The Optra M series does not have a protective drum shutter. Static Control recommends the use of drum paper or other type of protection during storage and shipping of the cartridges.
- The Optra M series does not have a chip, encoder wheel or prebate cartridges.
- The OEM M410 cartridge has a protective film over the back of the wiper blade, sealing it to the cartridge housing. This film is not present on the M412.

Optra® M Engine Information

	Lexmark® Optra® M410	Lexmark® Optra® M412
Printer Name		
Date of Introduction	Sept. 1999 (Current)	May 2000 (Current)
Print Speed	12 ppm	17 ppm (M412)
Toner Class	Magnetic, Mono-component	Magnetic, Mono-component

Cartridge Information

Component	OEM Part Number	List/Wholesale Price	OEM Rated Page Yield
M410 Toner Cartridge (Standard)	4K00198	$93/$144*	5,000
M410 Toner Cartridge (High Yield)	4K00199	$155/$239*	10,000
M412 Toner Cartridge (Standard)	17G0152	$78/$120*	5,000
M412 Toner Cartridge (High Yield)	17G0154	$163/$251*	15,000

**Prices as of August 2000*

Model Compatibility

Lexmark® Optra® M410/M420

Table of Contents

About the Cartridge 1
Drum Unit/Waste Bin - Disassembly of 4-6
Drum Unit/Waste Bin - Reassembly of 12-14
Separation of the Cartridge . . .2-3
Toner Hopper Unit - Disassembly of 7-9
Toner Hopper Unit - Reassembly of 10-11
Tools & Supplies You Will Need . .2
Use of Compressed Air 2
Use of Isopropyl Alcohol 2

WWW.SCC-INC.COM

Get the latest information on the web at Static Control's Lexmark® Optra® M410/M412 Online Engine Center at
www.scc-inc.com

System Support Series™ Documents are available on our Web site in Adobe® Acrobat® format.

If you need additional information or technical assistance, please contact your Support Team.

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Version I - Revised Oct. 2001

Tools and Supplies You Will Need

Use of Compressed Air

As of April 28, 1971, the Occupational Safety & Health Administration (OSHA) Standard, 29 CFR 1910.242 paragraphs a & b for general industry requires effective chip guarding and personal protective equipment (PPE) when using compressed air. When cleaning residual toner particles from cartridges using a compressed air system, you must use air nozzles meeting OSHA requirements. Air nozzles that regulate air pressure to a maximum of 30 psi comply with this standard. Refer to the OSHA publication for any updates or changes that have occurred since the date noted above.

Use of Isopropyl Alcohol

For best results, we recommend using ONLY 91-99% for cleaning as directed in these instructions. 91% isopropyl alcohol is available at most major drug stores; 99% isopropyl alcohol is available through distributors of chemical products. Follow the alcohol manufacturer's safety instructions.

Tools and Supplies

Recommended for Basic Remanufacturing:

- Phillips Screwdriver
- Small Flat-Blade Screwdriver
- Needle Nose Pliers
- Hook Tool . . . . . .HTOOL
- Conductive Cartridge Lubricant . . . . . .CONCLUBE
- Compressed Air for Cleaning . . . . . *(See left)*
- 91-99% Isopropyl Alcohol . . . . . *(See left)*
- Lint-free Foam Tip Swab . . . . . .LFSWAB
- Cotton Swab . . . . . .QTIP
- Kynar® Lubricating Powder . . . . . .KPOW
- Toner qualified for Optra® M410/M412
- Lexmark® Optra® M410/M412 Printer

Separation of the Cartridge

NOTE There is no shutter on the Optra® M to protect the OPC. If you plan to reuse the drum, wear gloves or use other aids to prevent touching the drum with your bare hands, and use extreme care not to damage the OPC while separating the cartridge.

1. Prepare to separate the cartridge

Remove any OEM warranty labels from over the hopper cap (FIG 1a) and between the hopper and waste bin sections (FIG 1b) before proceeding.

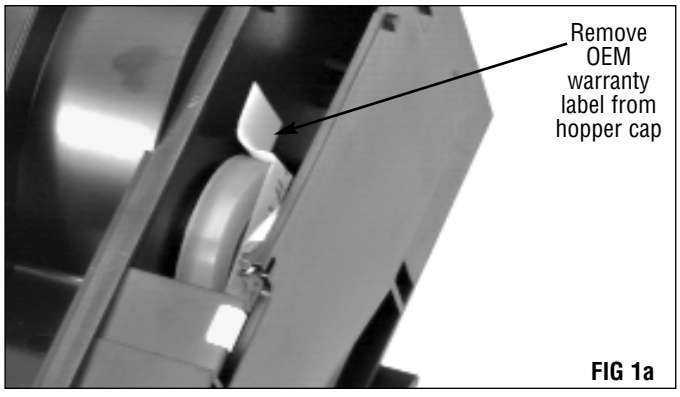

FIG 1a

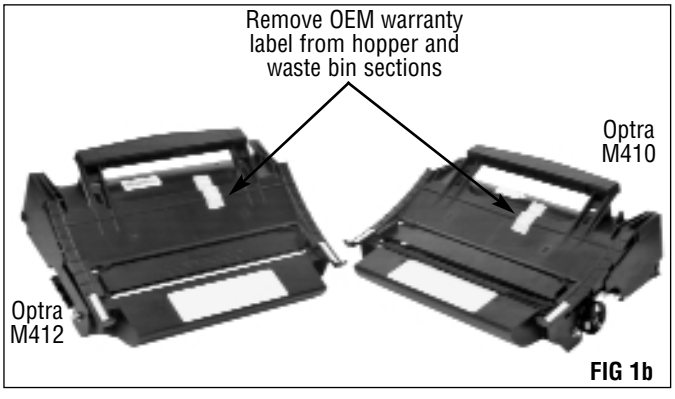

FIG 1b

Position the cartridge on your work surface with the handle down, drum up and away from you (FIG 2).

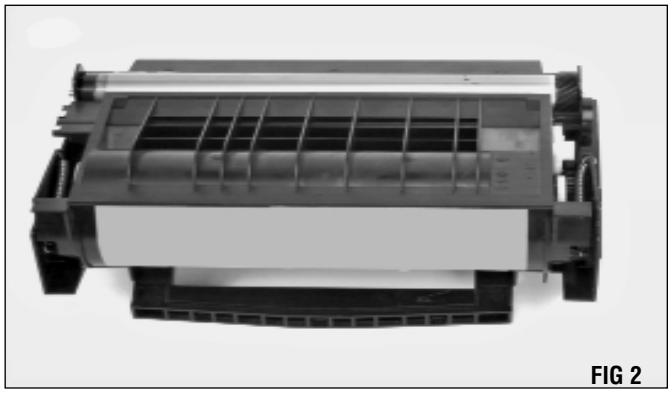

FIG 2

2. Release the hopper tension springs

Using light pressure only, hold the flange of the waste bin section slightly out and away from the hopper section. Using a pair of needlenose pliers or a hook tool (shown), carefully remove the end of the hopper tension spring that is attached to the hopper section (FIG 3). Repeat for the other side of the cartridge.

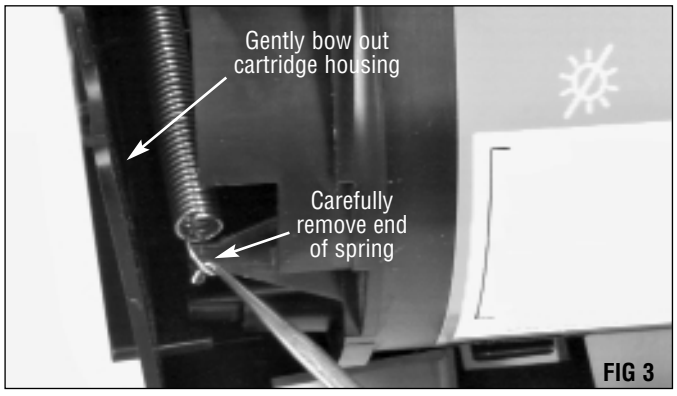

FIG 3

NOTE Testing has indicated that stretched tension springs can contribute to light print problems. Do not overstretch or deform the spring.

3. Separate the sections

Lift the toner hopper section up and back to separate it from the waste bin section (FIG 4). Note that the stabilizer posts on the hopper section may bind on the waste bin section. A slight side-to-side motion may be necessary to release the posts.

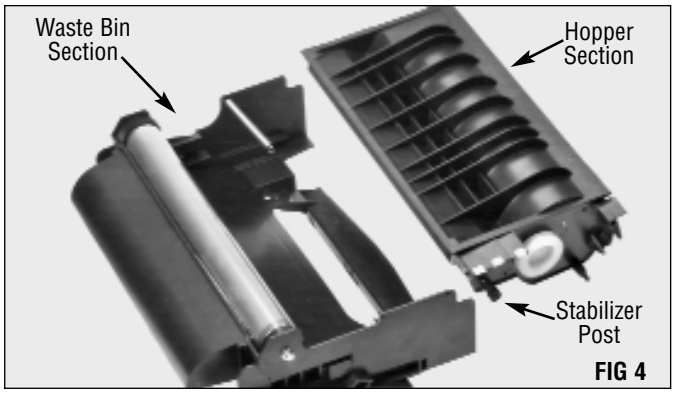

FIG 4

Disassembly of the Waste Bin Section

1. Remove the drum

Position the waste bin section on your work surface with the top of the waste bin face down, drum up.

FIG 5

Place the tip of a flat-blade screwdriver into one of the notched areas of the retaining ring (E-ring) and pry the ring from the helical gear end of the drum axle (FIG 6).

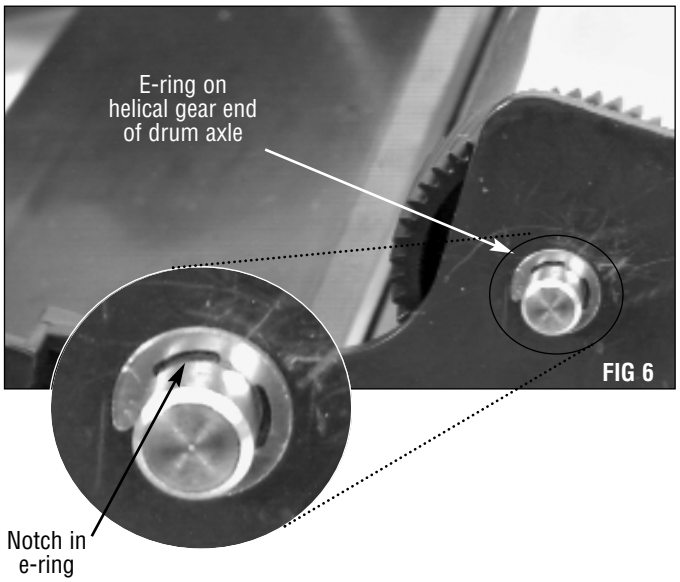

FIG 6

There is no need to remove the retaining ring from the non-geared end.

Push the drum axle into the drum from the helical gear end. This will expose enough of the axle on the non-geared end to grasp with your fingers and pull the axle out of the drum (FIG 7).

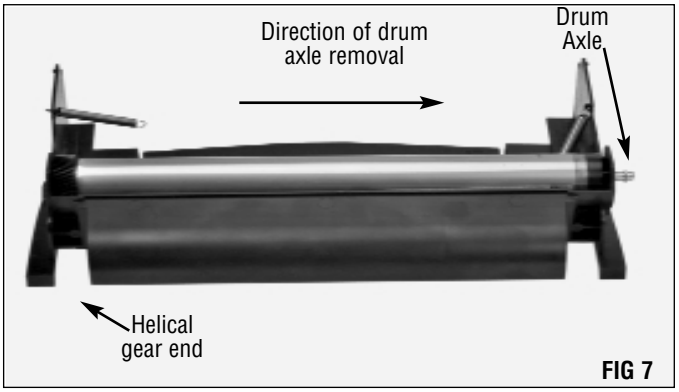

FIG 7

Remove the drum axle by pulling it out from the non-geared end of the drum. Support the drum by the helical gear during axle removal.

NOTE An electrical contact is located inside the drum on the helical gear end. Attempting to remove the axle from this end will damage the contact resulting in drum failure.

Lift the drum up and out of the hopper section.

FIG 2

Static Control recommends replacing the OPC drum after the OEM cycle and after each remanufacturing cycle.

If you do not plan to reuse the drum, you may need the torsion spring and washer for your replacement OPC. If so, remove the spring by carefully twisting and pulling it off the hub (FIG 8). You may need to use a flat blade screwdriver to move the spring out enough to grasp it in your fingers.

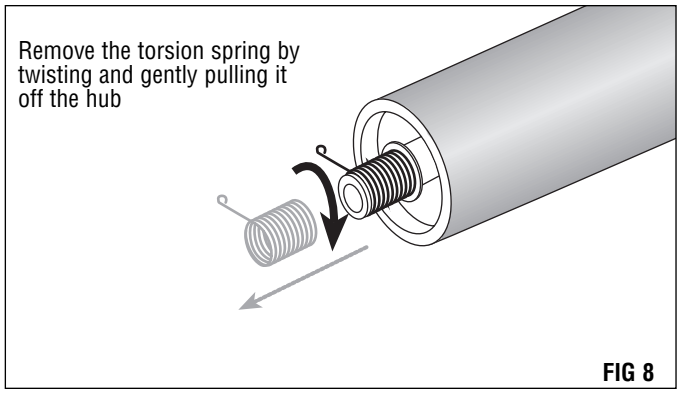

FIG 8

NOTE Take care not to stretch or otherwise distort the torsion spring.

Using a small flat blade screwdriver, remove the plastic washer (FIG 9).

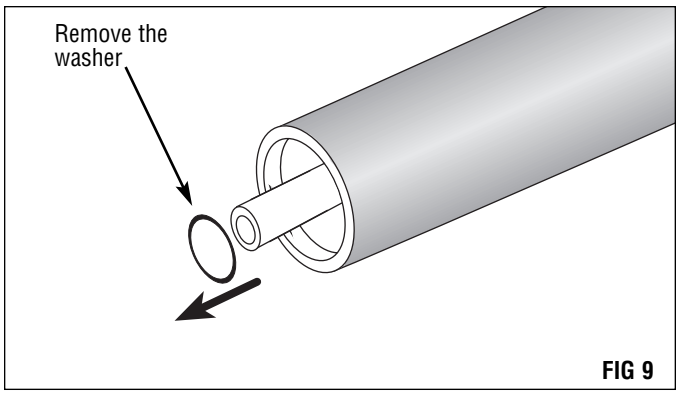

FIG 9

NOTE If you plan to reuse the drum, store it where it will be protected from light and impact damage.

2. Remove the wiper blade

This step applies only to the OEM Optra® M410 toner unit. Carefully loosen the adhesive film from the laser port area on the exterior of the waste bin section (FIG 10). You do not need to completely remove the film at this time.

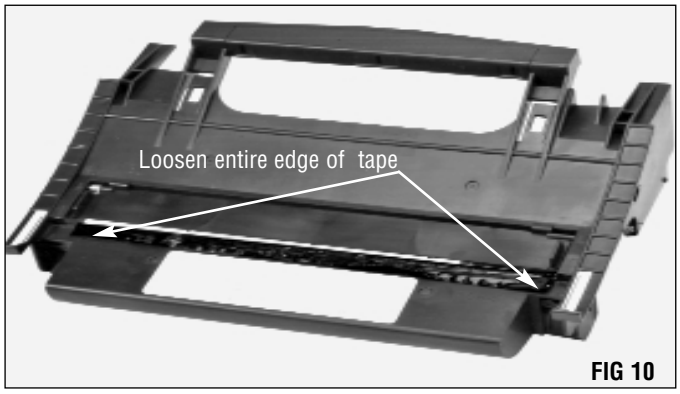

FIG 10

NOTE The adhesive film is not present on the Optra® M412. The remainder of these instructions are applicable for both the M410 and M412 cartridges.

Turn the waste bin section over and remove the two screws that secure the wiper blade (FIG 11).

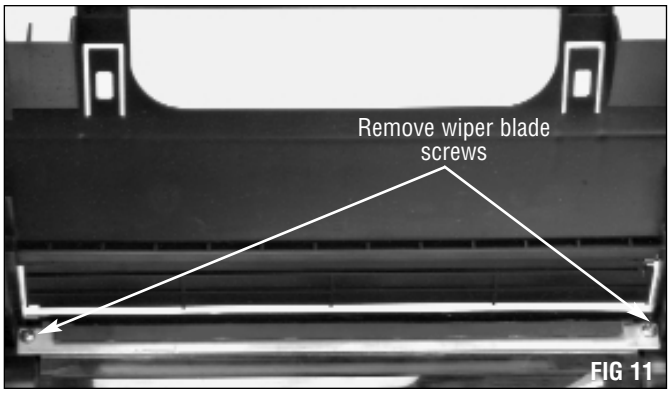

FIG 11

While holding the laser port shutter open, lift the wiper blade out of the waste bin section (FIG 12).

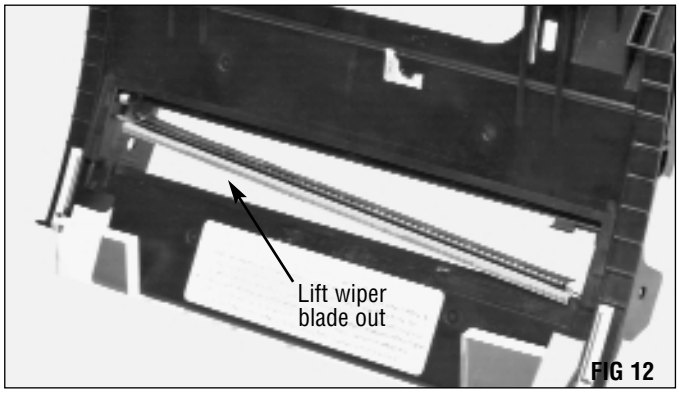

FIG 12

There are two wiper blade end foams which sit in recesses on either end of the waste bin. These are not held in with adhesive. Be sure to remove the two sealing foams before cleaning the waste bin (FIG 13).

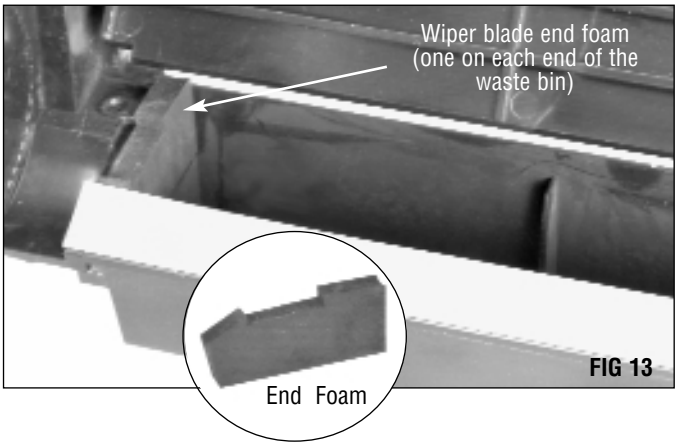

FIG 13

3. Inspect the components

The recovery blade should display a smooth, flat surface void of kinks or waviness along the edge (FIG 14). Remove the blade if it appears to be damaged or has been dislodged.

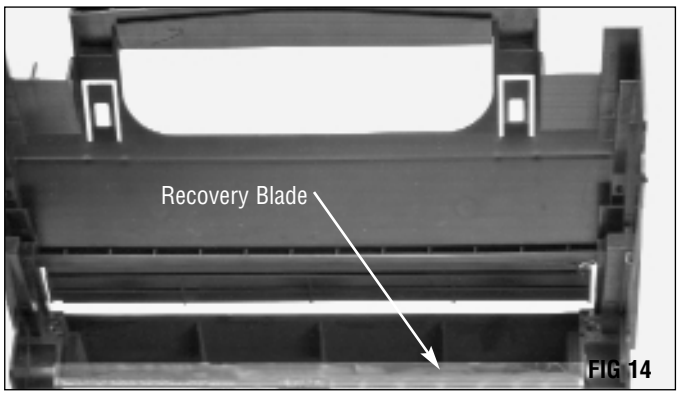

FIG 14

4. Inspect the PCR cleaning felt

The PCR cleaning felt is located on the wiper blade (FIG X). Toner will compact on the felt, causing it to lose its ability to effectively clean the PCR. For optimum results Static Control recommends replacing the PCR cleaning felt at least every third remanufacturing cycle.

If needed, remove the PCR cleaning felt (FIG 15).

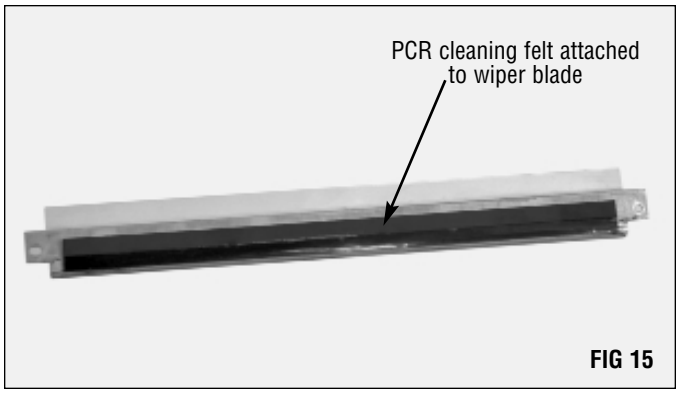

FIG 15

5. Clean the waste bin

Dump the waste toner from the waste bin, then clean all residual toner using dry, filtered, compressed air of not more than 30 psi (FIG 16). Be careful not to damage the recovery blade.

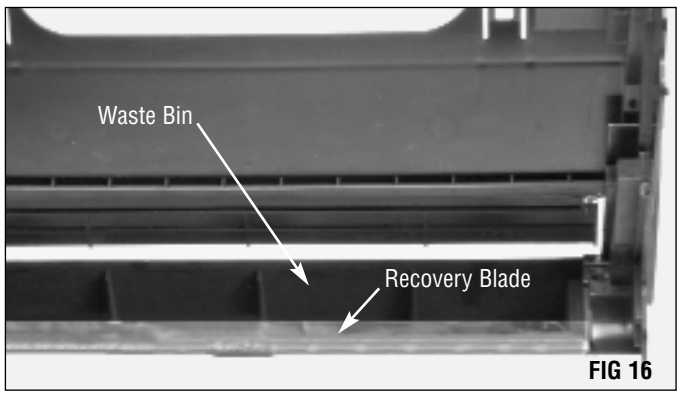

FIG 16

Disassembly of the Hopper Section

NOTE Leave the doctor bar in place, and always remove the leaf spring before removing the developer roller. Leaving the spring in place without the developer roller will force the doctor bar from its installed position.

1. Remove the doctor bar leaf spring

Using your thumbs on either side of the doctor bar leaf spring, press in and up to release it from the spring seat (FIG 17) . Lift the spring up and remove it from the hopper section. Be careful not to bend or deform the spring.

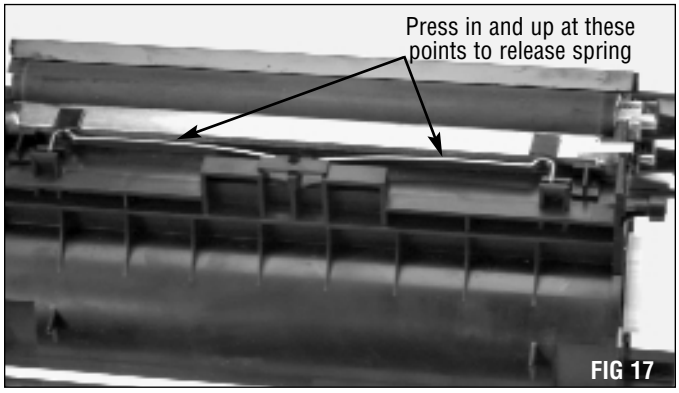

FIG 17

NOTE Always use gloves or other protective materials when handling the developer roller.

2. Remove the developer roller

Using a flat blade screwdriver, pry the developer roller drive gear away from the hopper fixture (FIG 18), then carefully pull it off of the developer roller shaft.

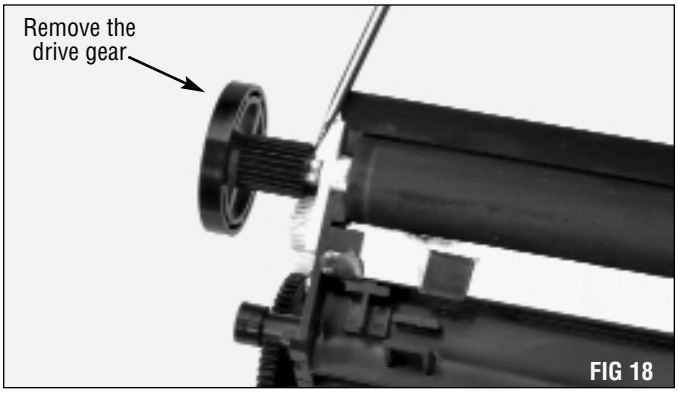

FIG 18

Using a pair of needlenose pliers and a slight twisting motion, carefully remove the brass developer roller shaft contact bushing (FIG 19).

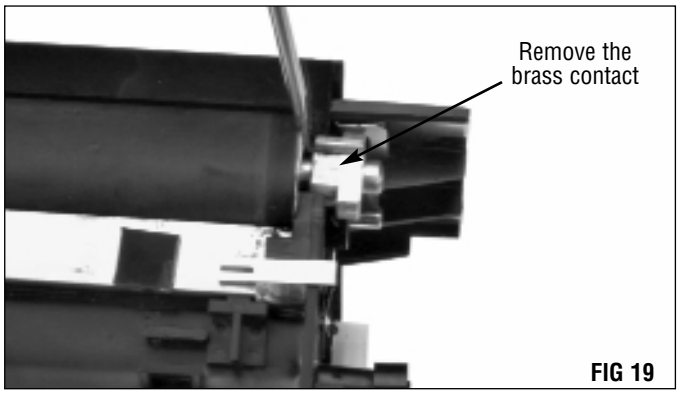

FIG 19

Lift up on the developer roller shaft (bushing end) while pressing in on the drive gear end to help free the shaft from the gear plate (FIG 20). Lift the developer roller up and out.

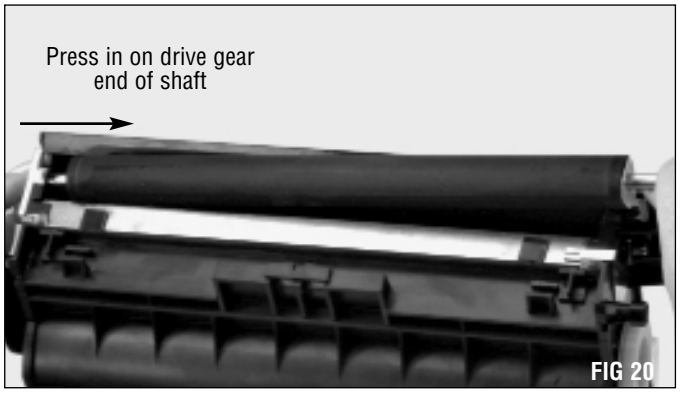

FIG 20

Remove the two washers on either end of the developer roller (FIG 21).

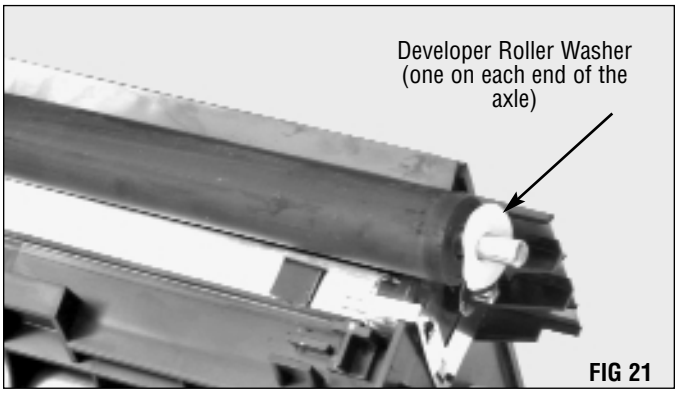

FIG 21

3. Remove the hopper cap

The toner hopper cap is made up of a breather cap, filter and an outer cap.

Remove the outer cap, using a small flat head screwdriver to carefully pry up the edges. Remove the inner filter, then the breather cap (FIG 22).

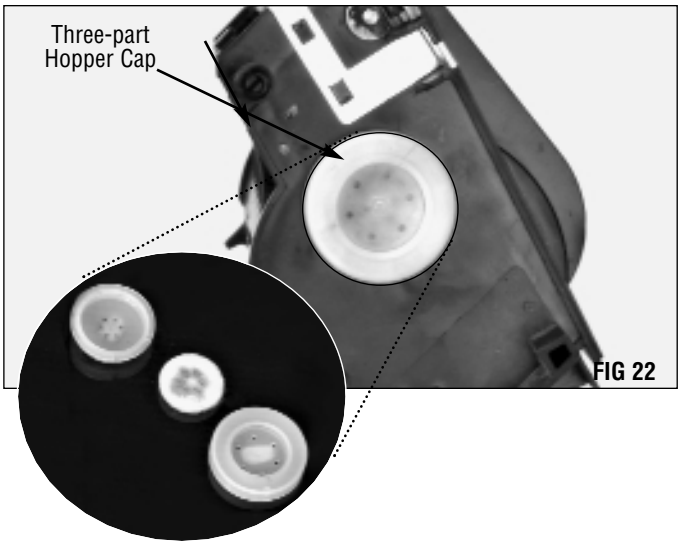

FIG 22

Clean all three hopper cap components using dry, filtered, compressed air.

4. Clean the hopper

After emptying any residual toner from the hopper, clean the hopper, doctor bar, inner and outer sealing blades and the toner adder roller using dry, filtered compressed air (FIG 23). Inspect all components and replace any that appear damaged.

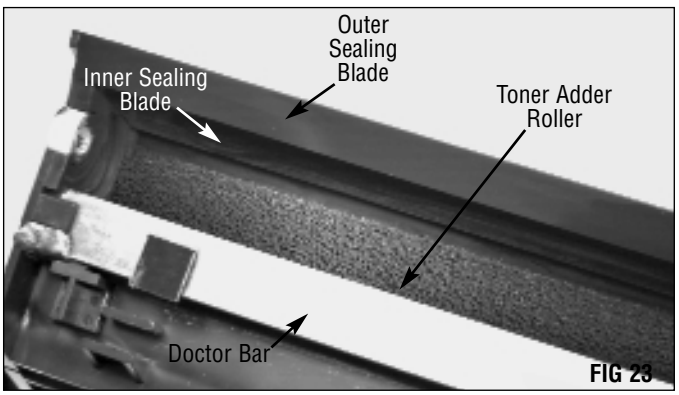

FIG 23

NOTE Although the gears of the drive train fit tightly, they may be blown off if the compressed air stream is directed on or around them. Use caution when using compressed air around these gears.

5. Clean the doctor bar

Using a lint-free swab or lint-free cleaning cloth, remove any toner build-up from the working edge of the doctor bar (FIG 24). Do not use any abrasive cleaners.

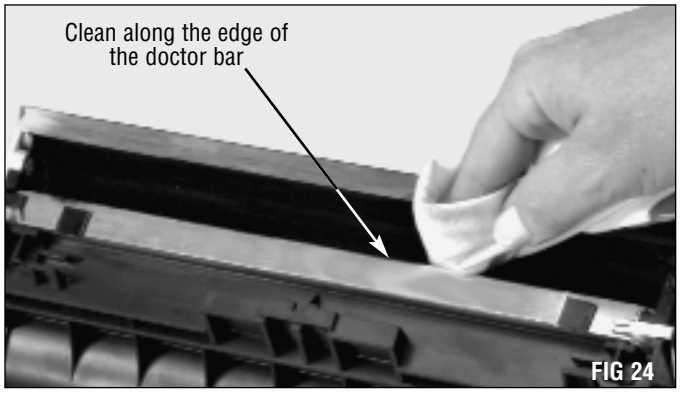

FIG 24

6. Clean the developer roller end gaskets

There is a rubber gasket at each end of the developer roller port that is layered, similar to a fish gill (FIG 25). Toner builds up along the edges of the "gills".

Using a lint-free swab dampened with 91-99% isopropyl alcohol clean these developer roller end gaskets. Be sure to clean beneath the layered areas, or "gills".

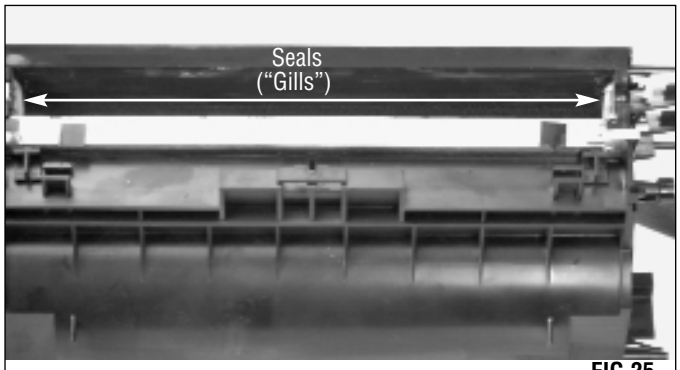

FIG 25

7. Clean the developer roller

Clean the developer roller using dry, filtered, compressed air.

NOTE Do not use alcohol or any any chemical to clean the developer roller.

Assembly of the Hopper Section

NOTE Remember to use gloves or other protective materials when handling the developer roller. Do not touch the surface with your bare skin.

1. Install the developer roller

Make sure a developer roller washer is installed at each end of the developer roller axle (FIG 26).

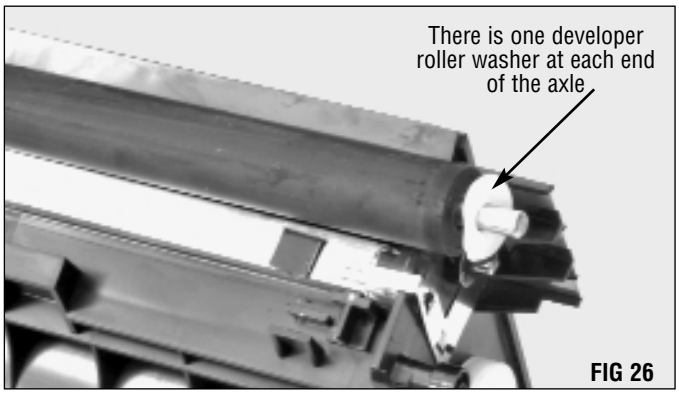

FIG 26

Place the keyed end of the developer roller axle into the hole in the drive train plate (FIG 27).

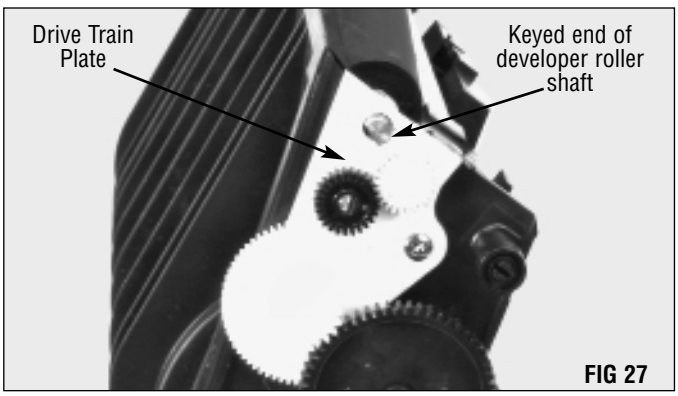

FIG 27

Ease the contact end of the developer roller shaft into place, being careful not to distort the washer (FIG 28).

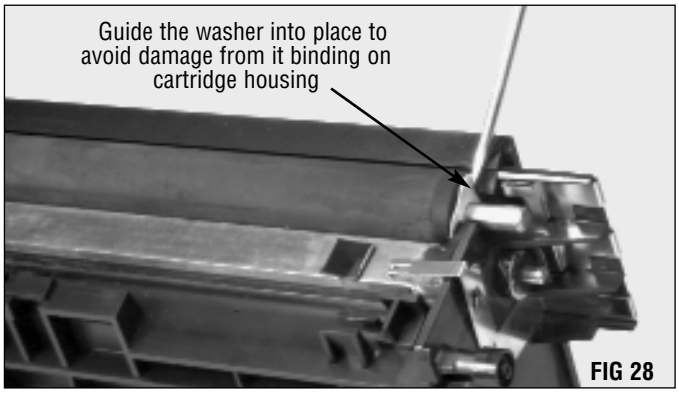

FIG 28

Place the brass contact over the axle and carefully slide it onto the axle approximately 4.98mm (.196 inch). Do not force it further or you may bend the electrical contact located on the cartridge housing (FIG 29).

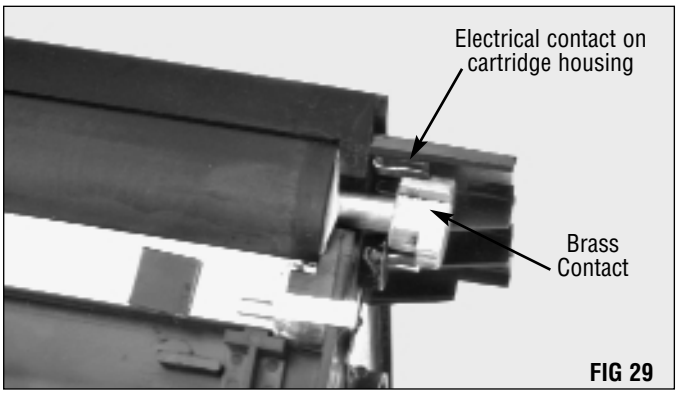

FIG 29

Using a small flat blade screwdriver, hold the contact (located on the cartridge housing) out of the way as you slide the brass contact onto the developer roller axle. Rotate the brass contact slightly until it snaps into place (FIG 30).

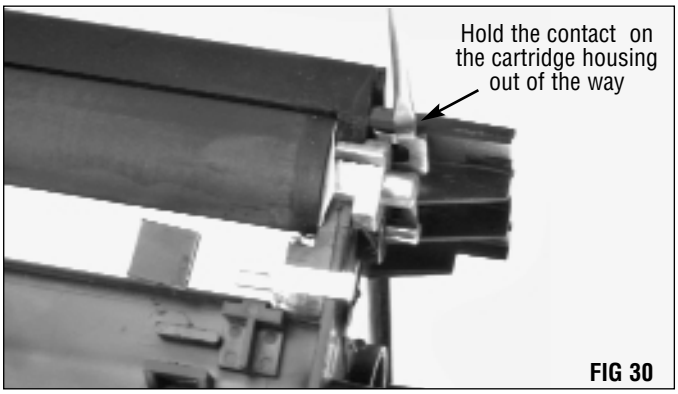

FIG 30

NOTE There are two small squares of plastic attached to the doctor bar. These act as a guard to prevent scratching of the doctor bar when the leaf spring is removed and replaced. Do not remove these guards.

2. Install the doctor bar leaf spring

Place the doctor bar leaf spring on the cartridge with the bend in the spring resting in the recess in the cartridge (FIG 31). The ends of the spring should be pointing down, over the plastic guards.

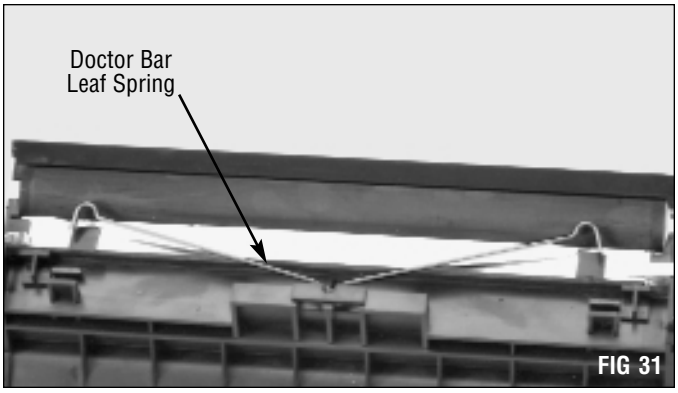

FIG 31

While bracing the hopper section in both hands, press the ends of the leaf spring down with your thumbs and snap them into place (FIG 32).

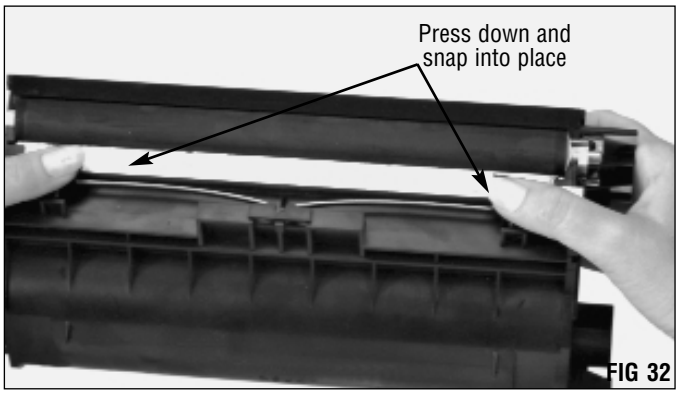

FIG 32

NOTE Be careful not to scratch the developer roller with the ends of the leaf spring.

3. Fill the hopper with toner

Fill the hopper through the fill hole, replace the breather cap, filter and outer hopper cap.

Assembly of the Waste Bin Section

1. Install a new recovery blade (if needed)
If you removed the recovery blade, install a new replacement blade at this time.

2. Clean the wiper blade
For OEM M410 cartridges, remove the adhesive film from the wiper blade (FIG 33). The film is not present on the M412.Be careful not to disturb the PCR cleaning assembly unless you are planning to replace it.

Static Control recommends cleaning the wiper blade with dry, filtered, compressed air only. For best results replace the wiper blade each time you replace the drum.

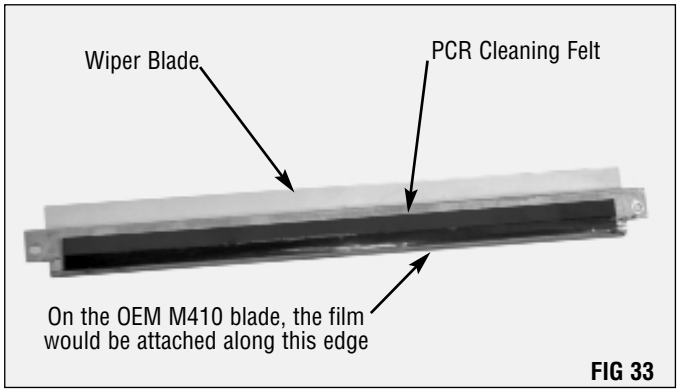

FIG 33

NOTE Do not use alcohol or any alcohol-based solvent to clean the polyurethane blade.

3. Install a new PCR cleaning felt, if needed
If you removed the cleaning felt or assembly, install a new replacement felt or assembly at this time.

4. Lubricate the wiper blade
When applied to the working edge of the blade, a lubricating powder will help prevent blade "flip overs" during the first drum rotations of the remanufactured cartridge. Static Control recommends padding the wiper blade regardless of whether you are reusing the old blade or using a new replacement blade.

Before installing the wiper blade, dip the edge of the blade in the lubricating powder. Examine the length of the blade to ensure even coverage and repeat the dipping process one time (FIG 34).

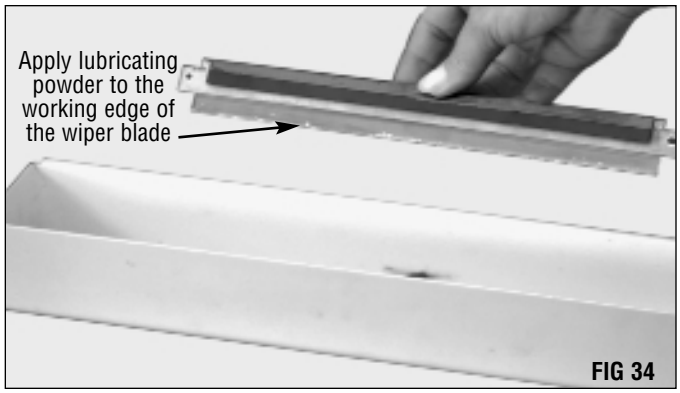

FIG 34

5. Install the wiper blade
Replace the two wiper blade end foams by slipping them under the recovery blade and pressing them into place (FIG 35). Make sure the angled edge of the foams is toward the front, allowing the recovery blade to rest on them (FIG 36).

These foams will be held in place by the wiper blade, and need no adhesive.

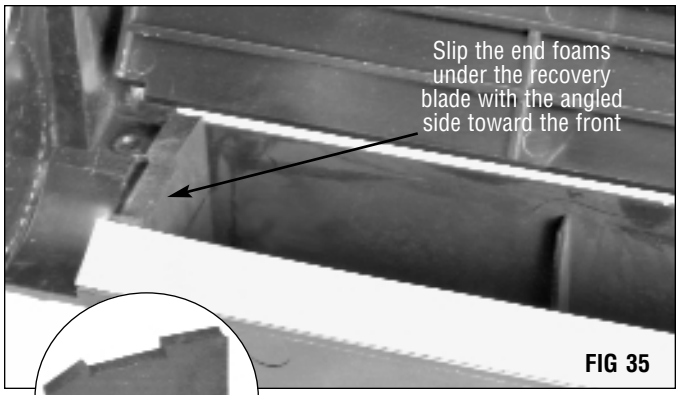

FIG 35

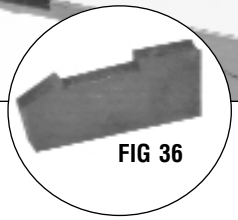
FIG 36

Slip the lip on the back edge of the wiper blade over the cartridge edge, under the laser port shutter (FIG 37) and seat the blade into position. Secure with one screw at each end.

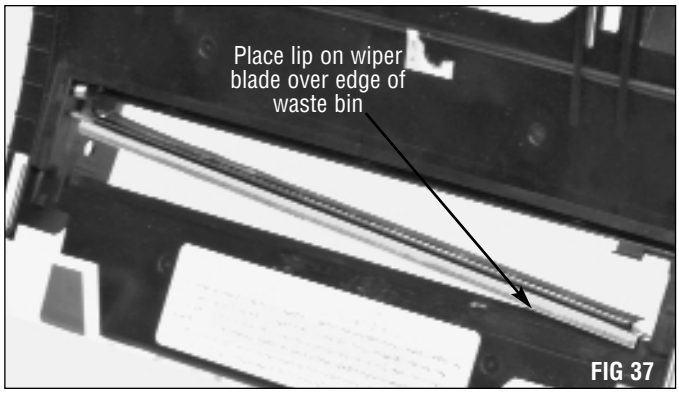

FIG 37

6. Replace the OPC drum

If you are reusing the drum, clean it with compressed air or a soft, lint-free cloth.

For best results, Static Control recommends replacing the OEM drum after the OEM cycle.

NOTE For best results, Static Control recommends using only dry, filtered, compressed air or a soft, lint-free cloth to clean the drum. Be careful not to nick the surface of the drum with the air nozzle.

Make sure a torsion spring is in place on the non-geared end of the drum (FIG 38).

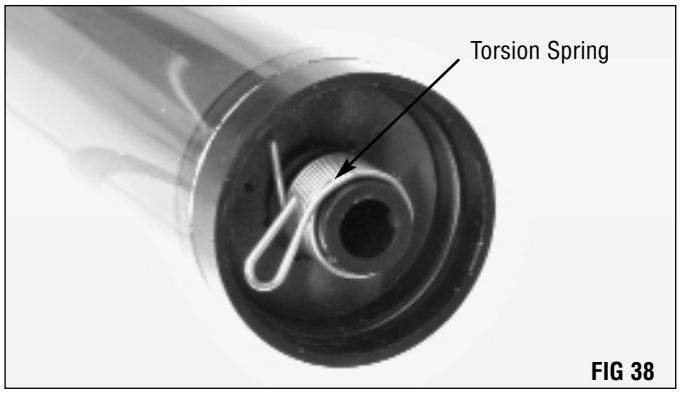

FIG 38

Pad the coated area of the drum with a lubricating powder, being careful to avoid getting powder on the gear (FIG 39).

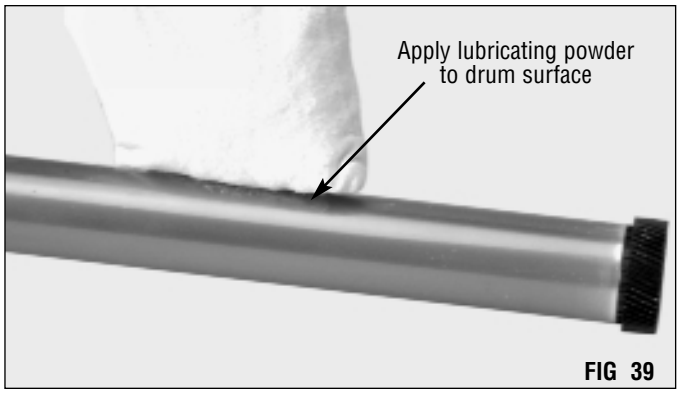

FIG 39

Place the drum into the cartridge with the torsion spring to the inside (FIG 40). Both the drum axle hub and the spring should slide between the two alignment rails molded to the cartridge.

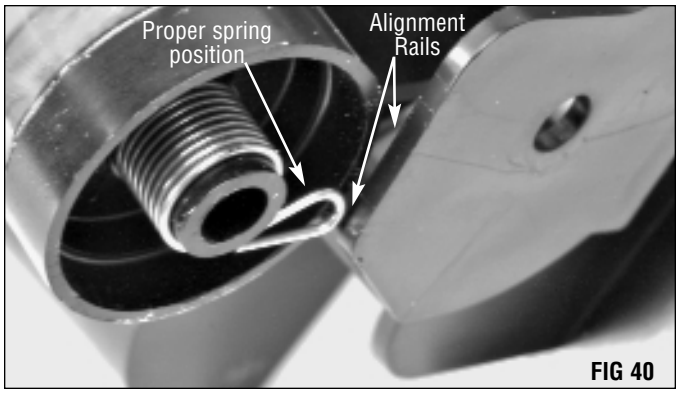

FIG 40

NOTE To prevent damage to the drum electrical contact inside the drum, always install the drum axle through the helical gear end of the drum.

Insert the end of the axle into the the cartridge (gear-end) and into the drum (FIG 41).

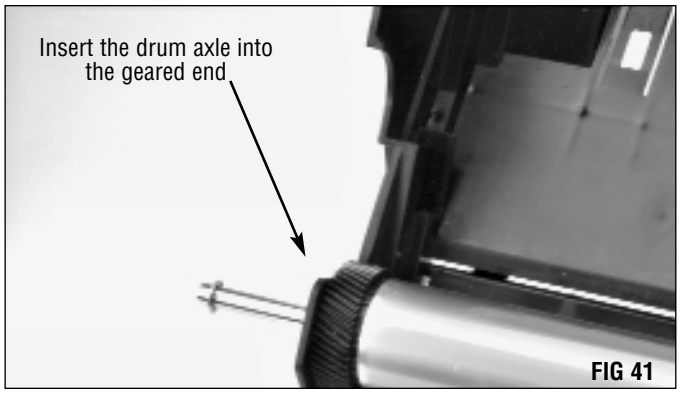

FIG 41

Using gloves or other protective materials, press the drum into place. Align the hole in the non-geared end of the drum with the hole in the cartridge and carefully slide the axle through until it is stopped by the E-ring on the geared end (FIG 42).

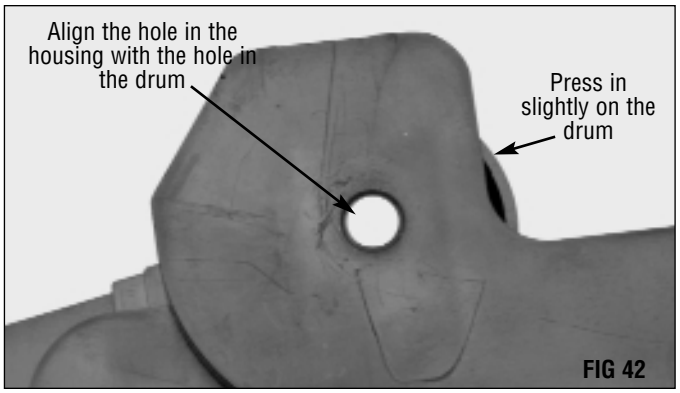

FIG 42

Replace the retaining e-ring and snap it into position (FIG 43).

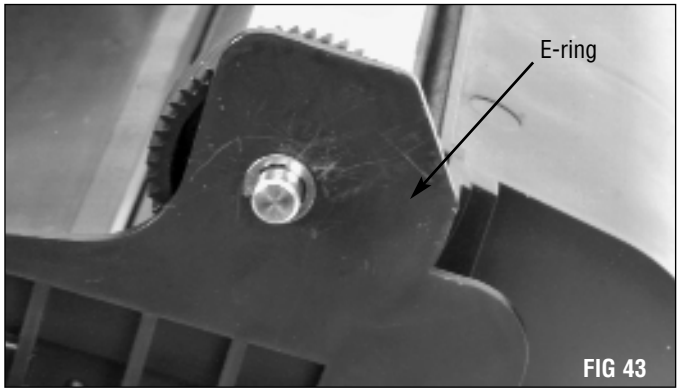

FIG 43

Rotate the drum at least six full rotations to help lubricate the wiper blade and prevent potential blade “flip overs”. The lubricating powder wiped from the drum by the wiper blade will be deposited in the waste bin.

Assembly of the Cartridge

1. Attach the cartridge springs

Secure one end of each of the hopper tension springs in the holes in the waste bin section. Allow the springs to hang inside the housing (FIG 44).

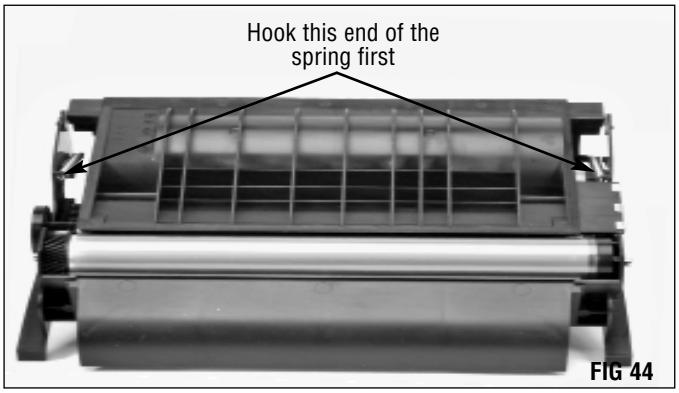

FIG 44

2. Assemble the cartridge

There are two locating pegs on either side of the hopper section that will slide into corresponding slots in the waste bin section (FIG 45).

Position the waste bin section on your work surface with the drum face up. Lift the waste bin slightly to allow the hopper tension springs to move out of the way. Place the hopper section into the waste bin section.

Slide the two sections together, slipping the pegs into the slots.

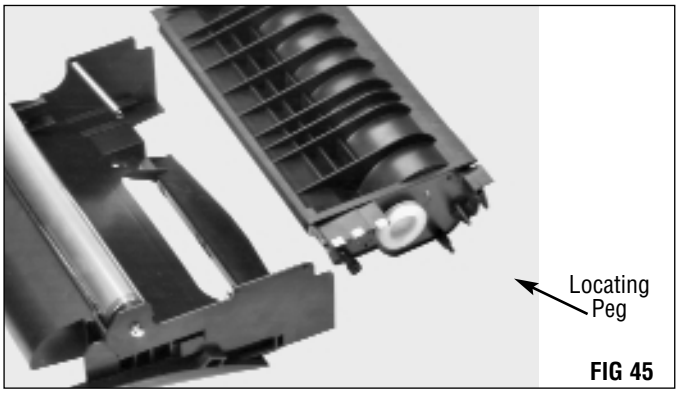

FIG 45

3. Secure the two halves

Using a hook tool or needlenose pliers, attach the loose end of each hopper tension spring to the corresponding molded hooks on the hopper section (FIG 46). Try not to break the hooks, but if you do simply hook the spring over the edge of the hopper section.

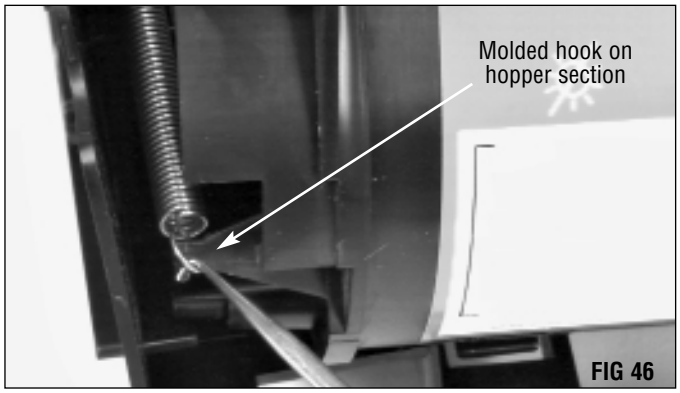

FIG 46

NOTE Do not overstretch or deform the spring. Testing has indicated that stretched tension springs can contribute to light print problems. There are several types of OEM tension springs. Make sure you are using springs of the same type at each end of the cartridge.

Replace the developer roller drive gear (FIG 47).

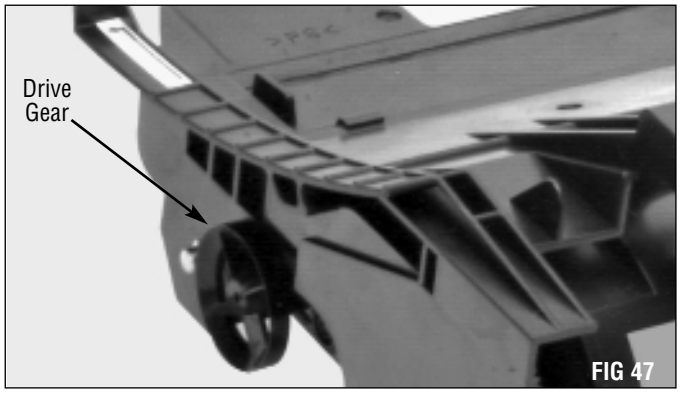

FIG 47

Static Control recommends testing your cartridges in the appropriate printer(s) after remanufacturing.

NOTE The Optra® M does not come with a protective drum shutter. Be sure to cover the drum with a protective material during storage and shipping to prevent light and impact damage.

Imaging System Technology You Can Count On!

The development of cartridge imaging systems, such as the Optra® M410/M412 Imaging System, is the primary mission of our imaging technology laboratories. Through extensive testing and research, we develop the optimum combination of matched components for each cartridge system. Our engineering and manufacturing expertise provides us with total control in design, quality and development to produce products from the ground up. The result is a system of components that seamlessly work together in each designed cartridge application.

This dedication and commitment results in integrated cartridge systems that Static Control fully supports, allowing you to quickly attack new market opportunities with complete confidence in the reliability and performance of your cartridges.

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