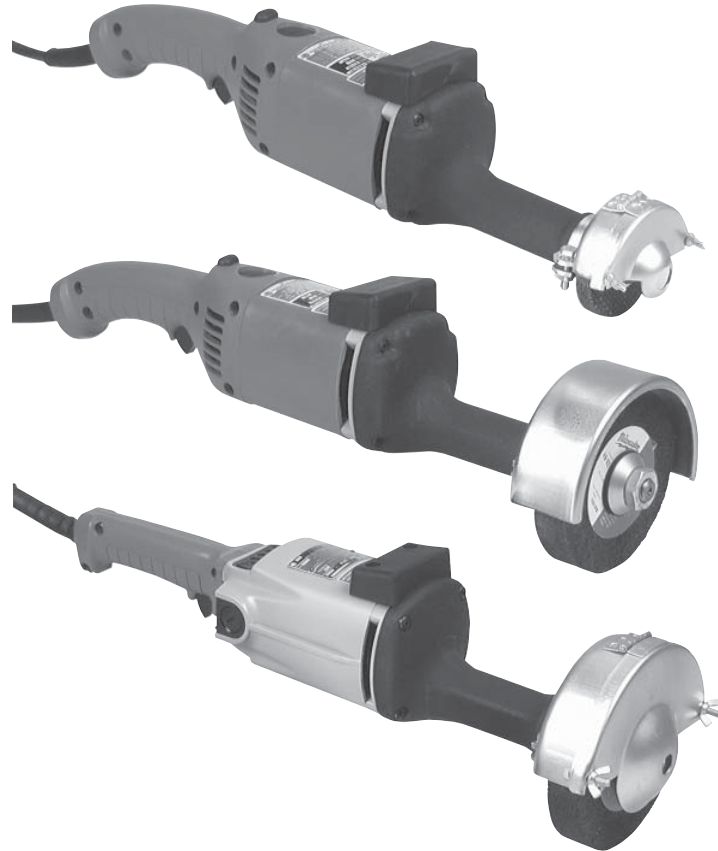




OPERATOR'S MANUAL



Cat. No. 5211,
5223, 5243

HEAVY-DUTY STRAIGHT GRINDERS



WARNING To reduce the risk of injury, user must read and understand operator's manual.

GENERAL POWER TOOL SAFETY WARNINGS

WARNING Read all safety warnings, instructions, illustrations and specifications provided with this power tool. Failure to follow all instructions listed below may result in electric shock, fire and/or serious injury. Save all warnings and instructions for future reference. The term "power tool" in the warnings refers to your mains-operated (corded) power tool or battery-operated (cordless) power tool.

WORK AREA SAFETY

- Keep work area clean and well lit. Cluttered or dark areas invite accidents.
- Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases or dust. Power tools create sparks which may ignite the dust or fumes.
- Keep children and bystanders away while operating a power tool. Distractions can cause you to lose control.

ELECTRICAL SAFETY

- Power tool plugs must match the outlet. Never modify the plug in any way. Do not use any adapter plugs with earthed (grounded) power tools. Unmodified plugs and matching outlets will reduce risk of electric shock.
- Avoid body contact with earthed or grounded surfaces, such as pipes, radiators, ranges and refrigerators. There is an increased risk of electric shock if your body is earthed or grounded.
- Do not expose power tools to rain or wet conditions. Water entering a power tool will increase the risk of electric shock.
- Do not abuse the cord. Never use the cord for carrying, pulling or unplugging the power tool. Keep cord away from heat, oil, sharp edges or moving parts. Damaged or entangled cords increase the risk of electric shock.
- When operating a power tool outdoors, use an extension cord suitable for outdoor use. Use of a cord suitable for outdoor use reduces the risk of electric shock.
- If operating a power tool in a damp location is unavoidable, use a ground fault circuit interrupter (GFCI) protected supply. Use of an GFCI reduces the risk of electric shock.

PERSONAL SAFETY

- Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use a power tool while you are tired or under the influence of drugs, alcohol or medication. A moment of inattention while operating power tools may result in serious personal injury.
- Use personal protective equipment. Always wear eye protection. Protective equipment such as a dust mask, non-skid safety shoes, hard hat or hearing protection used for appropriate conditions will reduce personal injuries.
- Prevent unintentional starting. Ensure the switch is in the off-position before connecting to power source and/or battery pack, picking up or carrying the tool. Carrying power tools with your finger on the switch or energizing power tools that have the switch on invites accidents.
- Remove any adjusting key or wrench before turning the power tool on. A wrench or a key left

attached to a rotating part of the power tool may result in personal injury.

- Do not overreach. Keep proper footing and balance at all times. This enables better control of the power tool in unexpected situations.
- Dress properly. Do not wear loose clothing or jewelry. Keep your hair and clothing away from moving parts. Loose clothes, jewelry or long hair can be caught in moving parts.
- If devices are provided for the connection of dust extraction and collection facilities, ensure these are connected and properly used. Use of dust collection can reduce dust-related hazards.
- Do not let familiarity gained from frequent use of tools allow you to become complacent and ignore tool safety principles. A careless action can cause severe injury within a fraction of a second.

POWER TOOL USE AND CARE

- Do not force the power tool. Use the correct power tool for your application. The correct power tool will do the job better and safer at the rate for which it was designed.
- Do not use the power tool if the switch does not turn it on and off. Any power tool that cannot be controlled with the switch is dangerous and must be repaired.
- Disconnect the plug from the power source and/or remove the battery pack, if detachable, from the power tool before making any adjustments, changing accessories, or storing power tools. Such preventive safety measures reduce the risk of starting the power tool accidentally.
- Store idle power tools out of the reach of children and do not allow persons unfamiliar with the power tool or these instructions to operate the power tool. Power tools are dangerous in the hands of untrained users.
- Maintain power tools and accessories. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the power tool's operation. If damaged, have the power tool repaired before use. Many accidents are caused by poorly maintained power tools.
- Keep cutting tools sharp and clean. Properly maintained cutting tools with sharp cutting edges are less likely to bind and are easier to control.
- Use the power tool, accessories and tool bits etc. in accordance with these instructions, taking into account the working conditions and the work to be performed. Use of the power tool for operations different from those intended could result in a hazardous situation.
- Keep handles and grasping surfaces dry, clean and free from oil and grease. Slippery handles and grasping surfaces do not allow for safe handling and control of the tool in unexpected situations.

SERVICE

- Have your power tool serviced by a qualified repair person using only identical replacement parts. This will ensure that the safety of the power tool is maintained.

SPECIFIC SAFETY RULES FOR STRAIGHT GRINDER

Safety Warnings Common for Grinding Operations:
• This power tool is intended to function as a grinder. Read all safety warnings, instructions, illustrations and specifications provided with this power tool. Failure to follow all instructions

listed below may result in electric shock, fire and/or serious injury.

- Operations such as sanding, wire brushing, polishing or cutting-off are not recommended to be performed with this power tool. Operations for which the power tool was not designed may create a hazard and cause personal injury.
- Do not use accessories which are not specifically designed and recommended by the tool manufacturer. Just because the accessory can be attached to your power tool, it does not assure safe operation.
- The rated speed of the accessory must be at least equal to the maximum speed marked on the power tool. Accessories running faster than their rated speed can break and fly apart.
- The outside diameter and the thickness of your accessory must be within the capacity rating of your power tool. Incorrectly sized accessories cannot be adequately guarded or controlled.
- Threaded mounting of accessories must match the grinder spindle thread. For accessories mounted by flanges, the arbour hole of the accessory must fit the locating diameter of the flange. Accessories that do not match the mounting hardware of the power tool will run out of balance, vibrate excessively and may cause loss of control.
- Do not use a damaged accessory. Before each use inspect the accessory such as abrasive wheels for chips and cracks, backing pad for cracks, tear or excess wear, wire brush for loose or cracked wires. If power tool or accessory is dropped, inspect for damage or install an undamaged accessory. After inspecting and installing an accessory, position yourself and bystanders away from the plane of the rotating accessory and run the power tool at maximum no-load speed for one minute. Damaged accessories will normally break apart during this test time.
- Wear personal protective equipment. Depending on application, use face shield, safety goggles or safety glasses. As appropriate, wear dust mask, hearing protectors, gloves and workshop apron capable of stopping small abrasive or workpiece fragments. The eye protection must be capable of stopping flying debris generated by various operations. The dust mask or respirator must be capable of filtering particles generated by your operation. Prolonged exposure to high intensity noise may cause hearing loss.
- Keep bystanders a safe distance away from work area. Anyone entering the work area must wear personal protective equipment. Fragments of workpiece or of a broken accessory may fly away and cause injury beyond immediate area of operation.
- Hold the power tool by insulated gripping surfaces only, when performing an operation where the cutting tool may contact hidden wiring or its own cord. Contact with a "live" wire may also make exposed metal parts of the power tool "live" and could give the operator an electric shock.
- Position the cord clear of the spinning accessory. If you lose control, the cord may be cut or snagged and your hand or arm may be pulled into the spinning accessory.
- Never lay the power tool down until the accessory has come to a complete stop. The spinning accessory may grab the surface and pull the power tool out of your control.
- Do not run the power tool while carrying it at your side. Accidental contact with the spinning accessory

could snag your clothing, pulling the accessory into your body.

- Regularly clean the power tool's air vents. The motor's fan will draw the dust inside the housing and excessive accumulation of powdered metal may cause electrical hazards.
- Do not operate the power tool near flammable materials. Sparks could ignite these materials.
- Do not use accessories that require liquid coolants. Using water or other liquid coolants may result in electrocution or shock.

Kickback and Related Warnings

Kickback is a sudden reaction to a pinched or snagged rotating wheel, backing pad, brush or any other accessory. Pinching or snagging causes rapid stalling of the rotating accessory which in turn causes the uncontrolled power tool to be forced in the direction opposite of the accessory's rotation at the point of the binding. For example, if an abrasive wheel is snagged or pinched by the workpiece, the edge of the wheel that is entering into the pinch point can dig into the surface of the material causing the wheel to climb out or kick out. The wheel may either jump toward or away from the operator, depending on direction of the wheel's movement at the point of pinching. Abrasive wheels may also break under these conditions.

Kickback is the result of power tool misuse and/or incorrect operating procedures or conditions and can be avoided by taking proper precautions as given below.

- Maintain a firm grip on the power tool and position your body and arm to allow you to resist kickback forces. Always use auxiliary handle, if provided, for maximum control over kickback or torque reaction during start-up. The operator can control torque reactions or kickback forces, if proper precautions are taken.
- Never place your hand near the rotating accessory. Accessory may kickback over your hand.
- Do not position your body in the area where power tool will move if kickback occurs. Kickback will propel the tool in direction opposite to the wheel's movement at the point of snagging.
- Use special care when working corners, sharp edges etc. Avoid bouncing and snagging the accessory. Corners, sharp edges or bouncing have a tendency to snag the rotating accessory and cause loss of control or kickback.
- Do not attach a saw chain woodcarving blade or toothed saw blade. Such blades create frequent kickback and loss of control.

Safety Warnings Specific for Grinding Operations:

- Use only wheel types that are recommended for your power tool and the specific guard designed for the selected wheel. Wheels for which the power tool was not designed cannot be adequately guarded and are unsafe.
- The grinding surface of centre depressed wheels must be mounted below the plane of the guard lip. An improperly mounted wheel that projects through the plane of the guard lip cannot be adequately protected.
- The guard must be securely attached to the power tool and positioned for maximum safety, so the least amount of wheel is exposed towards the operator. The guard helps to protect the operator from broken wheel fragments, accidental contact with wheel and sparks that could ignite clothing.
- Wheels must be used only for recommended applications. For example: do not grind with the side of cut-off wheel. Abrasive cut-off wheels are

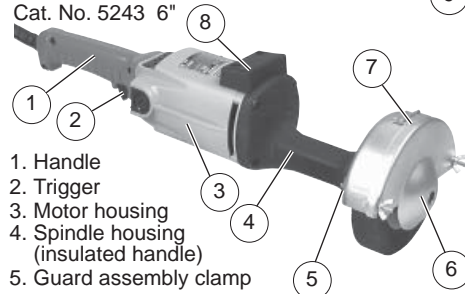
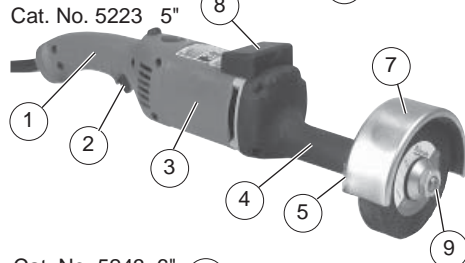
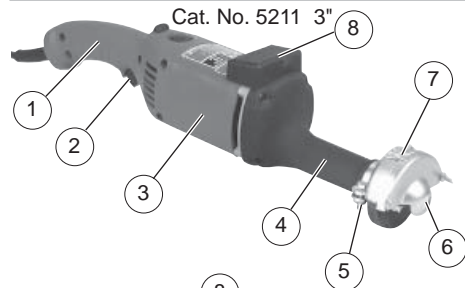
intended for peripheral grinding, side forces applied to these wheels may cause them to shatter.

- **Always use undamaged wheel flanges that are of correct size and shape for your selected wheel.** Proper wheel flanges support the wheel thus reducing the possibility of wheel breakage. Flanges for cut-off wheels may be different from grinding wheel flanges.
- **Do not use worn down wheels from larger power tools.** Wheel intended for larger power tool is not suitable for the higher speed of a smaller tool and may burst.

Additional Safety Warnings

- **Maintain labels and nameplates.** These carry important information. If unreadable or missing, contact a MILWAUKEE service facility for a free replacement.
- **AWARNING** Some dust created by power sanding, sawing, grinding, drilling, and other construction activities contains chemicals known to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:
 - lead from lead-based paint
 - crystalline silica from bricks and cement and other masonry products, and
 - arsenic and chromium from chemically-treated lumber.
 Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles.

FUNCTIONAL DESCRIPTION



1. Handle
2. Trigger
3. Motor housing
4. Spindle housing (insulated handle)
5. Guard assembly clamp
6. Faceplate
7. Guard assembly
8. Tool rest
9. Spindle Nut

EXTENSION CORDS

Grounded tools require a three wire extension cord. Double insulated tools can use either a two or three wire extension cord. As the distance from the supply outlet increases, you must use a heavier gauge extension cord. Using extension cords with inadequately sized wire causes a serious drop in voltage, resulting in loss of power and possible tool damage. Refer to the table shown to determine the required minimum wire size.

The smaller the gauge number of the wire, the greater the capacity of the cord. For example, a 14 gauge cord can carry a higher current than a 16 gauge cord. When using more than one extension cord to make up the total length, be sure each cord contains at least the minimum wire size required. If you are using one extension cord for more than one tool, add the nameplate amperes and use the sum to determine the required minimum wire size.

Guidelines for Using Extension Cords

- If you are using an extension cord outdoors, be sure it is marked with the suffix "W-A" ("W" in Canada) to indicate that it is acceptable for outdoor use.
- Be sure your extension cord is properly wired and in good electrical condition. Always replace a damaged extension cord or have it repaired by a qualified person before using it.
- Protect your extension cords from sharp objects, excessive heat and damp or wet areas.

Nameplate Amps	Recommended Minimum Wire Gauge For Extension Cords*				
	Extension Cord Length				
	25'	50'	75'	100'	150'
0 - 2.0	18	18	18	18	16
2.1 - 3.4	18	18	18	16	14
3.5 - 5.0	18	18	16	14	12
5.1 - 7.0	18	16	14	12	12
7.1 - 12.0	16	14	12	10	--
12.1 - 16.0	14	12	10	--	--
16.1 - 20.0	12	10	--	--	--

* Based on limiting the line voltage drop to five volts at 150% of the rated amperes.

GROUNDING

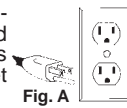
AWARNING Improperly connecting the grounding wire can result in the risk of electric shock. Check with a qualified electrician if you are in doubt as to whether the outlet is properly grounded. Do not modify the plug provided with the tool. Never remove the grounding prong from the plug. Do not use the tool if the cord or plug is damaged. If damaged, have it repaired by a MILWAUKEE service facility before use. If the plug will not fit the outlet, have a proper outlet installed by a qualified electrician.

Grounded Tools (Three-Prong Plugs)

Tools marked "Grounding Required" have a three wire cord and three prong grounding plug. The plug must be connected to a properly grounded outlet (See Figure A). If the tool should electrically malfunction or break down, grounding provides a low resistance path to carry electricity away from the user, reducing the risk of electric shock.

The grounding prong in the plug is connected through the green wire inside the cord to the grounding system in the tool. The green wire in the cord must be the only wire connected to the tool's grounding system and must never be attached to an electrically "live" terminal.

Your tool must be plugged into an appropriate outlet, properly installed and grounded in accordance with all codes and ordinances. The plug and outlet should look like those in Figure A.



Double Insulated Tools (Two-Prong Plugs)

Tools marked "Double Insulated" do not require grounding. They have a special double insulation system which satisfies OSHA requirements and complies with the applicable standards of Underwriters Laboratories, Inc., the Canadian Standard Association and the National Electrical Code. Double Insulated tools may be used in either

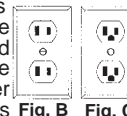


Fig. B



Fig. C

ASSEMBLY

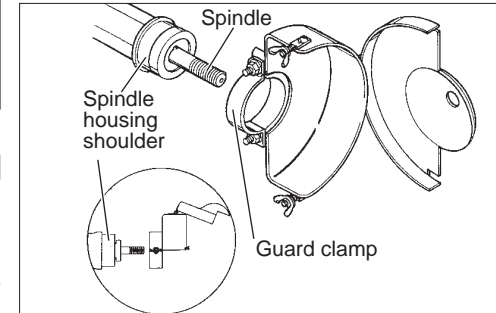
AWARNING To reduce the risk of injury, always unplug tool before changing or removing accessories. Only use accessories specifically recommended for this tool. Others may be hazardous.

To reduce the risk of injury, the wheel guard must be flush with the spindle housing.

Installing Guard Assemblies

The guards for all tools in this manual are mounted the same way:

1. Unplug tool and lay it on its tool rest.
2. Loosen guard clamping fasteners.
3. Position guard clamp over the spindle housing and against the housing shoulder.



4. Position guard so the operator is always behind the guard. The open edge of the guard should face the workpiece.
5. Tighten wheel guard clamps.

Grinding Wheel Selection

Only use wheels that:

- are high-strength
- are resinoid bond
- are the proper grit
- are the correct size
- are rated at or above the RPM listed on the tool's nameplate
- have blotters that cover the entire flange contact area.

Grit Selection

The lower the grit number, the coarser the wheel. Coarser wheels should be used for rough grinding and finer wheels for finish grinding (see "Accessories").

Wheel Material

Grinding wheels are made from various materials and are meant for different jobs. Be sure you choose the proper wheel for the job you plan to do. MILWAUKEE Straight Grinders use type 1, straight wheels as defined by the American National Standards Institute (ANSI). Type 1 straight wheels are made to be used for edge grinding. They are not to be used for side grinding.

Care of Grinding Wheels

Grinding wheels should be protected from"

- wetness and extreme humidity
- any type of solvent
- extreme changes in temperature
- dropping and bumping.

Grinding wheels should be stored:

- in an organized way so wheels can be removed without disturbing or damaging other wheels
- with their safety information.

SPECIFICATIONS

Cat. No.	5211
Volts	120 AC/DC
	Double Insulated
Rated RPM	16000
Arbor Size Diameter, Threads	3/8"-24
Wheel Size Thickness, Diameter	1/2"x3"
Cat. No.	5223
Volts	120 AC/DC
	Double Insulated
Rated RPM	8500
Arbor Size Diameter, Threads	5/8"-11
Wheel Size Thickness, Diameter	1"x5"
Cat. No.	5243
Volts	120 AC/DC
	Grounding Required
Rated RPM	7000
Arbor Size Diameter, Threads	5/8"-11
Wheel Size Thickness, Diameter	1"x6"

SYMBOLGY



Double Insulated



Volts



Alternating Current/Direct Current



Amps

n XXXX min⁻¹ Rated Revolutions per Minute (RPM)



UL Listing Mark for Canada and U.S.



Approval Mark for Mexico

Grinding wheels should NOT be:

- dropped
- rolled
- bumped.

If any wheel is dropped, rolled, bumped, subjected to extreme changes in temperature, or has come into contact with solvents or wetness, discard wheel immediately.

▲WARNING To reduce the risk of injury and damage to the tool, use **ONLY** accessories rated at or above the RPM listed on the tool's nameplate.

To Test the Wheel:

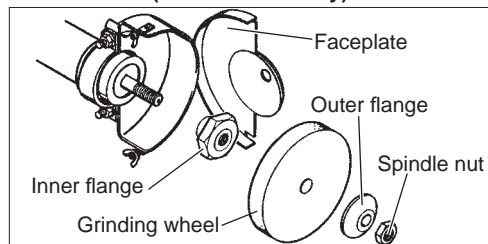
NOTE: Wheel must be dry to do this test.

1. Suspend the wheel by its arbor hole on a small pin or a finger.
2. Tap the side of the wheel with the back of a screwdriver (or any similar, solid, non-metallic object).
3. Rotate wheel 90° and repeat the test in three more places.

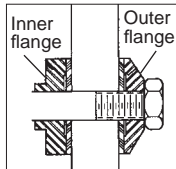


If the wheel rings, it is in good condition. If it does not ring, it is bad and should be discarded.

Installing Grinding Wheels and Accessories (Cat. No. 5211 only)



1. Unplug tool and lay it on its tool rest.
2. Loosen wing nuts. Move studs aside and swing the faceplate away.
3. Hold inner flange with 1" wrench provided with the tool.
4. Remove the spindle nut with the 9/16" wrench provided with the tool.
5. Remove outer flange and wheel.
6. Examine both flanges to ensure that they are free of nicks and are flat.

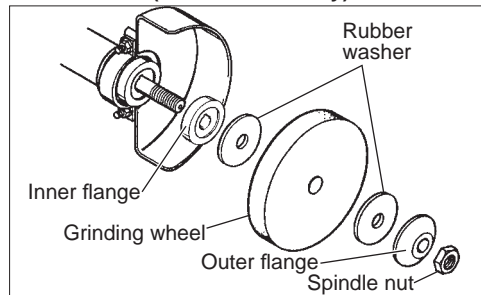


NOTE: If the flange faces are nicked, or if the inner surfaces of the flanges are not flat, then replace them with identical replacement parts. On Cat. No. 5211, the flanges should evenly contact the blotter on the wheel.

7. If you are installing a grinding wheel, inspect and test it for damage (see "To Test the Wheel").
8. Place the accessory on the spindle. Never force an accessory onto the spindle. A forced fit may damage the accessory.
9. Replace outer flange and spindle nut.
10. Tighten spindle nut. Do not overtighten.
11. Swing the faceplate back into place. Move studs back into slots. Tighten wing nuts.

▲WARNING To reduce the risk of injury, use only identical replacement parts.

Installing Grinding Wheels and Accessories (Cat. No. 5223 only)

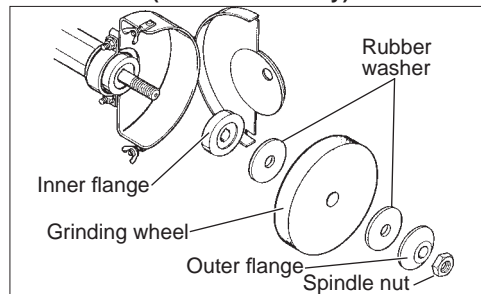


1. Unplug tool and lay it on its tool rest.
2. Hold inner flange with spanner wrench provided with the tool.
3. Remove the spindle nut with the 1-1/16" wrench provided with the tool.
4. Remove outer flange, rubber washer, and wheel.
5. Examine both flanges to ensure that they are free of nicks and are flat.

NOTE: If the flange faces are nicked, or if the inner surfaces of the flanges are not flat, then replace them with identical replacement parts. On Cat. No. 5223, the flanges should evenly contact the rubber washers on either side of the wheel.

6. If you are installing a grinding wheel, inspect and test it for damage (see "To Test the Wheel").
7. Place the accessory on the spindle. Never force an accessory onto the spindle. A forced fit may damage the accessory.
8. Replace rubber washer, outer flange, and spindle nut.
9. Tighten spindle nut. Do not overtighten.

Installing Grinding Wheels and Accessories (Cat. No. 5243 only)



1. Unplug tool and lay it on its tool rest.
2. Loosen wing nuts. Move studs aside and swing the faceplate away.
3. Hold inner flange with spanner wrench provided with the tool.
4. Remove the spindle nut with the 1-1/16" wrench provided with the tool.
5. Remove outer flange, rubber washer, and wheel.
6. Examine both flanges to ensure that they are free of nicks and are flat.

NOTE: If the flange faces are nicked, or if the inner surfaces of the flanges are not flat, then replace them with identical replacement parts. On Cat.

No. 5243, the flanges should evenly contact the rubber washers on either side of the wheel.

7. If you are installing a grinding wheel, inspect and test it for damage (see "To Test the Wheel").
8. Place the accessory on the spindle. Never force an accessory onto the spindle. A forced fit may damage the accessory.
9. Replace rubber washer, outer flange, and spindle nut.
10. Tighten spindle nut. Do not overtighten.
11. Swing the faceplate back into place. Move studs back into slots. Tighten wing nuts.

OPERATION

▲WARNING To reduce the risk of injury, always unplug tool before attaching or removing accessories or making adjustments. Use only specifically recommended accessories. Others may be hazardous.

To reduce the risk of injury, wear safety goggles or glasses with side shields.

Starting and Stopping the Tool

1. To start the tool, pull the trigger.
2. To stop the tool, release the trigger.

Using the Trigger Lock Mechanism

The lock button holds the trigger in the 'ON' position for continuous use.

1. To lock the trigger, hold the lock button in while pulling the trigger. Then, release the trigger.
2. To unlock the trigger, pull the trigger and release. The lock button will pop out.

Grinding

1. Use a clamp, vise or other practical means to hold your work, freeing both hands to control the tool.
2. Hold handle and spindle housing firmly.
3. Pull trigger.
4. Allow tool to reach full speed. Always test new wheels for cracks or damage. To test new wheels, point the grinder away from you and shield bystanders from the tool, and then run the motor at full speed for one minute while allowing the wheel to spin.
5. Gently apply grinder to the workpiece.

MAINTENANCE

▲WARNING To reduce the risk of injury, always unplug the tool before performing any maintenance. Never disassemble the tool. Contact a MILWAUKEE service facility for ALL repairs.

Maintaining Tools

Keep your tool in good repair by adopting a regular maintenance program. Inspect your tool for issues such as undue noise, misalignment or binding of moving parts, breakage of parts, or any other condition that may affect the tool operation. Return the tool to a MILWAUKEE service facility for repair. After six months to one year, depending on use, return the tool to a MILWAUKEE service facility for inspection.

▲WARNING To reduce the risk of personal injury, electric shock and damage, never immerse your tool in liquid or allow a liquid to flow inside it.

Cleaning

Clean dust and debris from vents. Keep handles clean, dry and free of oil or grease. Use only mild soap and a damp cloth to clean, since certain cleaning agents and solvents are harmful to plastics and other insulated parts. Some of these include gasoline, turpentine, lacquer thinner, paint thinner, chlorinated cleaning solvents, ammonia and household detergents containing ammonia. Never use flammable or combustible solvents around tools.

Repairs

For repairs, return the tool to the nearest service center.