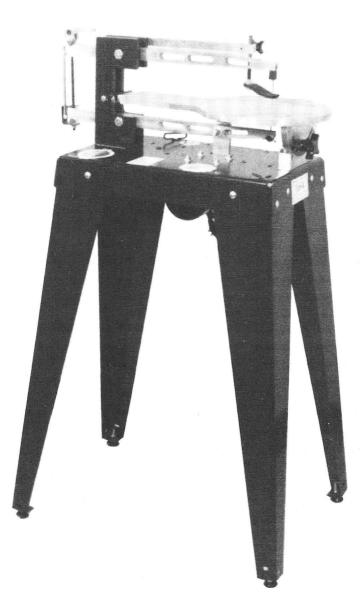
Bushton Manufacturing Maker Of Hawk Woodworking Tools

MODEL 214 HAWK SCROLL SAW OPERATORS MANUAL





MANUAL #HA 0987

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1

WARRANTY

We guarantee each Hawk Scroll Saw to be free from defects in material and workmanship for 1 year from date of delivery to original user. This warranty does not cover damage sustained in transit or from misuse of this piece of equipment.

This warranty does not obligate us to bear the cost of labor or transportation charges in connection with the replacement or repair of defective parts, nor shall it apply to any saw upon which repairs or alterations have been made unless authorized by us.

We make no warranty in respect to components, not of our manufacture, including motors, such being subject to the warranties of their respective manufacturers.

We shall in no event be liable for consequential damages or contingent liabilities arising out of the failure of any saw to operate properly.

No express, implied or statutory warranty other than herein set forth is made or authorized to be made by us.

ENCLOSED WARRANTY REGISTRATION CARD MUST BE RETURNED TO VALIDATE YOUR WARRANTY.

TO VALIDATE WARRANTY, CUSTOMERS Must mail in warranty card on receipt of machine.

TRAINING

- 1. Read the operators manual carefully. Be thoroughly familiar with the operation of the equipment.
- 2. Know where the controls are and how to operate them.
- 3. Wear safety goggles, ear protection and mask in dusty operations.
- 4. Never allow unsupervised children to operate equipment. Never allow adults to operate the equipment without proper instruction.
- 5. Keep work area clear of other persons.
- 6. Maintain a clean uncluttered work area.

OPERATION SAFETY I

- 1. Never make any adjustments while the machine is running.
- 2. Disconnect electrical power supply before doing any adjustments on the machine.
- 3. Remove all working tools and equipment before starting machine.
- 4. Wear proper clothing. Avoid loose fitted clothing, long sleeves, long hair, gloves, neck ties, jewelry, watches, rings, etc.
- 5. Do not operate an electrical device in a damp or wet area to avoid electrical shock.
- 6. Maintain all safety guards.
- 7. Do not operate machine while under the influence of medication, alcohol or drugs.
- 8. Never leave machine running unattended.
- 9. Don't overload machine. Follow operators instruction for safe operation.
- 10. Keep equipment in proper working order. Follow recommended maintenance procedures in the operators manual.

SET UP

NOTE: Damage and/or missing parts are to be reported to the transportation carrier. Manufacturer is not responsible for shipping damage.

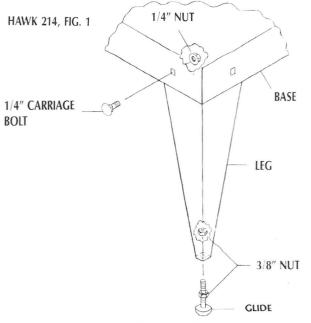
This saw is shipped complete in two cartons:

Carton 2

- 1. Saw
- 1. Legs
- 2. Operators manual 2. Glides (leg bottom)
- 3. Extra blades 3. Attaching hardware
- 1. Remove saw from shipping carton.
- 2. Check for damage.

Carton 1

- 3. Remove legs from carton.
- Install one leg on each corner of the base using 1/4' carriage bolts and nuts. (The top of the leg should be inside of the base.)
- 5. Install one 3/8" nut on each of the four glides.
- 6. Insert the glides up through the hole in the bottom of the leg. (See Fig. 1)
- 7. Install the second 3/8" nut on the glide to secure.
- 8. With all of the legs installed, position the saw upright and adjust the nuts on the glides so that each glide supports the saw.



NOTE: Optional adjustable 6" leg extension is available. Part #6LE (See Accessories)

MAINTENANCE I

Arm Pivot:

Add 3 to 4 drops of oil (light machine oil) to each side of the parallel arm pivot point bushings on the upper and lower arms every 16 hours.

Tensioning Rod:

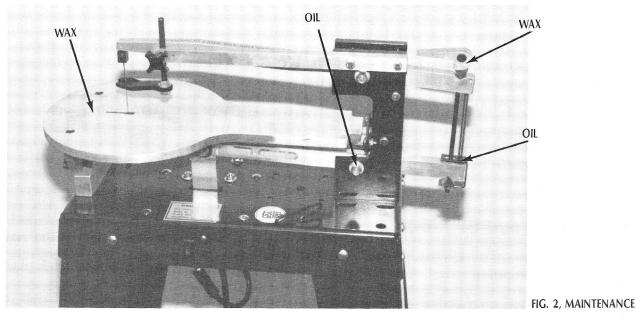
Add 1 to 2 drops of oil (light machine oil) to the threads of the blade tensioning rod at the bottom arm every 16 hours.

Table:

Keep the table work surface waxed (paraffin wax) to prevent oxidation and allow easier movement of the wood on the table surface.

Cam Over Handle:

Apply wax (paraffin wax) to sliding surface of handle to allow easier use.



SAWING TECHNIQUES

Starting:

It is best to begin the cut at a point or corner because it is difficult to smoothly blend in start and end points when starting on a side. When cutting out circular shapes, saw into the pattern line in a crosscutting (across the grain) direction. If the starting point must be on a curve, make it an outside curve. Burrs and knobs are easier to sand on an outside curve.

Sawing:

Feed the piece to be cut slowly into the saw blade while maintaining downward pressure on the piece. Do not force it into the blade—let the saw blade do the work. The speed at which you feed the wood into the blade depends on the type of wood you are cutting. Harder woods should be fed more slowly than softer varieties. Feeding too quickly into the blade may result in the blade burning the wood, bending or twisting of the blade while sawing, a rough edge on the cut, or the wood jumping on the table. Do not apply sideways pressure on the blade. The downward pressure on the wood may be applied by hand or the hold down foot.

Straight-line Cutting:

A small amount of set is formed on one side of most scroll saw blades due to the manufacturing process used to produce them. Because of this, most blades do not cut straight or parallel to the blade. The set causes them to cut a few degrees more to one side than the other. To saw a straight line, the work should be angled approximately 2 to 4 degrees to compensate for this. This may be accomplished freehand or with a guide board. The same technique should be used for straightline ripping. Be sure that the saw blade is following the layout line and not the grain when ripping. (See Fig. 3)

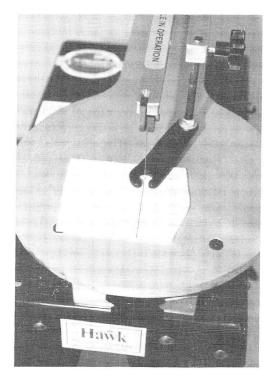


FIG. 3

Turns and Corners:

Scroll saws are capable of producing 360° turns while cutting. The kerf left after a turn is approximately 1/2 the width of the saw blade. When you want to cut a point, simply turn the piece the desired amount while maintaining downward pressure on it. It is not necessary to cut past the point and then restart, like the normal procedure for a band saw. When cutting curves, slowly follow the pattern line, turning the piece as you go so the teeth are following the line. It may be necessary to install a smaller blade when trying to saw an extremely tight corner or radius to prevent the wood from jumping on the table and to prevent blade breakage. (See Fig. 4)

Bevel Sawing:

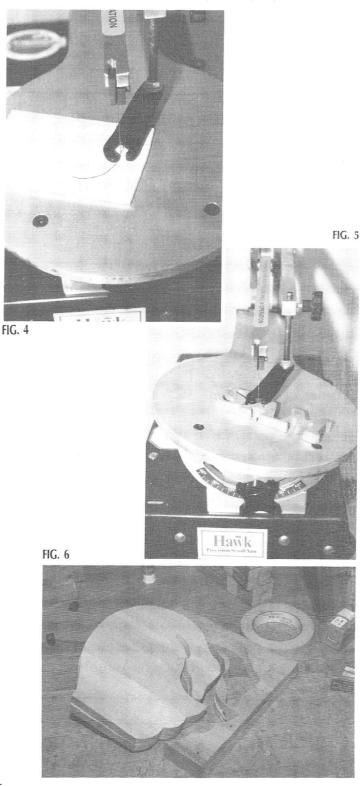
Bevel sawing is sawing with the table tilted, creating angled sides on the project. This sawing technique may be used to create inlays, decorative letters, or to put shapes into animals or other objects to be carved. To bevel saw on the Hawk, loosen the table tilt assembly knob and tilt the table to the desired angle. (See Fig. 5)

Stack Cutting:

Stack cutting saves time by cutting two or more pieces simultaneously. Simply stack the work pieces on top of each other and draw the pattern on the top piece. The pieces may be held together with double faced tape or nails may be driven into the scrap areas. Cut out the pattern on the top piece and disassemble the stack. Be sure that the saw table is perfectly square with the blade before sawing. (See Table Squaring Procedure) If it is not square, the pieces will not be uniform in size. The stack should not exceed 2" in height. (See Fig. 6)

Sawing Inside Openings:

Sawing inside openings is a common and frequently used process on scroll saws. It is cutting an opening on the inside of the work piece without cutting through the piece. To do this, drill a small hole that is large enough for the blade to pass through near the pattern line of the inside openings. Release blade tension by flipping the cam lock handle to the blade change position. Remove top of blade from the top blade holder (See Blade Changing). Insert the blade through the drilled hole in the work piece. Install the top of the saw blade back into the top blade holder.Retension the blade by flipping the cam lock handle to its original position. After the cut is finished, remove the blade from the opening. NOTE: Disconnect electrical power supply before making any adjustments to the machine. (See Fig. 7)



Compound Sawing:

The compound sawing process involves cutting on two or more sides of the work piece. To do this, simply lay out a pattern on two adjoining surfaces. These patterns may be identical or different. After the patterns are laid out, choose which surface to saw first. It usually will not make any difference which surface you choose, but consider the sequence before choosing. The side that will give the least amount of scrap pieces after it is cut should be first. After the first side is cut, return the scrap pieces to their original locations so that you have a prismatic shape to cutout the second surface. It may be helpful to nail, tape, or glue these scraps back on the piece. (See Fig. 8)

Inlaying:

To create inlayed projects, select two pieces of hardwood that contrast in color (walnut and oak work well). The two must be exactly the same thickness. It is recommended to use 1/4" thick material, but any thickness up to 1 inch will work. Draw the selected design on one of the pieces. Nail the two pieces together with the pattern on the top face. Be sure the nails do not penetrate through the bottom of the project as this will scratch the saw table surface. Drill a very small pilot hole (#60 drill bit) in a corner of the pattern. Slide a #2 blade through the drilled hole and install it in the top blade holder (be sure the pattern is still facing up). Tension the blade and tilt the table approximately 3-1/2° (tilt the table less for thicker material). Tilting to the left will cause the bottom cutout to be the insert. The tilt angle must be increased when using coarser blades. Holding down firmly on your project, begin the cut. Always saw in the same direction from start to finish. Saw around the pattern to the pilot hole and remove the blade. Separate the pieces and press the insert into the outer piece. Tap insert to set firmly. Complete the project by cutting the outside shape and sanding for finish with tung oil, varnish, or clear epoxy.

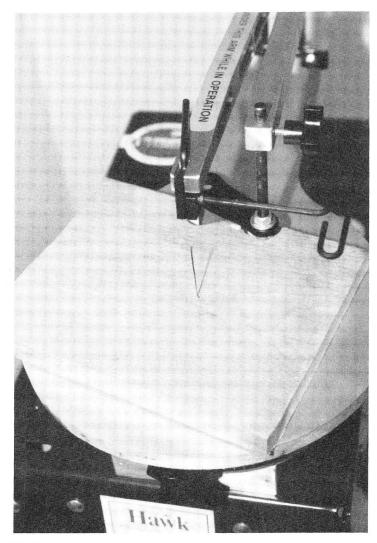
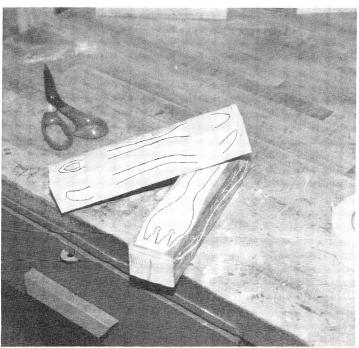


FIG. 7

FIG. 8



TROUBLE SHOOTING GUIDE

PROBLEM Excessive blade breakage	POSSIBLE CAUSE Improper blade size for wood thickness	POSSIBLE SOLUTION Select proper blade size. Increase blade size for thick wood. See Blade	//////////////////////////////////////	Wrong blade size	Use smaller blade. See Blade Selection Chart.
	Cutting too tight a radius for blade size	Selection Chart. Increase radius size or reduce blade size. Refer to		Wood grain stringy or knotty	
		Turns and Corners in Sawing Section.	Rough cut on the bottom	Blade too large	Use smaller blade. See Blade Selection Chart.
	Improper blade installation.	Install blade properly. See Blade Installation		Blade tension low	Increase blade ten- sion. See Blade Instal- lation in Saw
Blade burns the wood	Wrong blade size	Increase blade size Refer to Blade Selec- tion Chart.		Poor quality wood	Procedure. Use better quality wood.
	Cutting too small a radius	Increase radius or decrease blade size. Refer to Turns and Corners in Sawing section.	//////////////////////////////////////	Feeding too fast ////////////////////////////////////	Slow feed rate. See Sawing section. ////////////////////////////////////
х х	Improper feeding	Feed material at 4° right to left. Refer to Straight Line Sawing in Sawing section.	line	right to left of approximately 4° straight into the blade Operator error–Not	Sawing section. Practice.
	Pushing sideways on the blade	Feed straight so not to bend blade left or right. Refer to Saw- ing section.		following line Blade dull	Replace blade. See Blade Changing Procedure.
	High resin content in wood	Saw against grain when possible, use new blade.		Blade too small	Increase blade size See Blade Selection Chart.
	Feeding too fast	Reduce feed rate. Refer to Sawing		Improper blade tension	Increase tension. See Blade Installation Procedure.
	Improper blade tension	section. Increase blade tension. Refer to	///////////////////////////////////////	Forcing material into the blade. ////////////////////////////////////	Reduce feed speed. See Sawing section.
//////////////////////////////////////	Improper blade	Blade Installation ////////////////////////////////////	Wood jumps on the table	Improper hold down adjustment	Adjust the hold down to apply pres- sure to the board.
excessively or twist while sawing	tension	tension. Refer to Blade Installation Procedures.		Blade installed upside down	Install blade properly with teeth pointing down. See
	Improper blade size	Increase blade size See Blade Selection Chart.		Turning too tight of	Blade Changing Procedure. Increase radius
	0	Slow feed rate. Refer to Sawing section.			size. See Turns and Corners in Sawing section.
Blade cutting too large a radius	Ū	Use smaller blade. See Blade Selection Chart.		and not holding board down firmly	Hold board firmly on the table, especially when turn- ing. Feed properly.
		Increase blade ten- sion. See Blade Instal- lation Procedures.			See Sawing and Saw- ing Straight Line sections.
		Turn board properlySee Turns and Cornersin Sawing section.7	7	Pressing sideways	Reduce feed speed Feed properly. See Sawing section.

PROCEDURE FOR CHANGING THE BLADE

Step 1:

Release the Cam Over handle (HA-74) by flipping it over. Now place the 'L' shaped quick change hold rod (HA-65) behind the upper blade holder (FA-45) by inserting it with the shortest end in the vertical position and the longer end facing the rear of the saw in the open hole on the top of the upper arm. (Fig. 9) This is to help hold your upper blade holder in a stationary position. Place the 9/64" T handle allen wrench (ES-86) into the allen head cap screw on the right side of the upper blade holder and loosen the allen head cap screw. Remove any pieces left of the old blade. The blade is now ready to be removed from the lower blade holder.

Step 2:

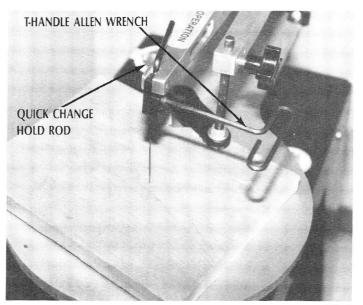
Located in the V notch of the lower arm is a small, barrel shaped blade holder (FA-46) (Fig. 10). Remove it by sliding the blade holder forward and slightly turning towards the front of the saw. This allows the blade to slide forward out of the notch in the arm. When the blade is free from the lower arm notch, slide it to the left or right to remove it from the V notch. Now place the saw blade holder on end in the oblong notch located on the base of your saw. Using a 5/16" open end wrench on the flats of the saw blade holder (FA-46), loosen the saw blade holder and remove the old blade. Insert the new blade (teeth pointing down) between the two halves of the barrel of the blade holder (FA-46). Be sure to touch the bottom of the blade to the top of the center screw of the blade holder.

Step 3:

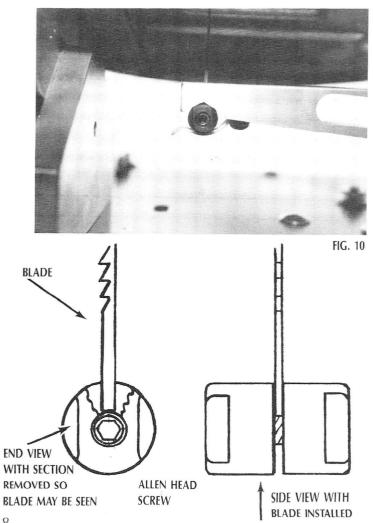
You are now ready to put the blade and holder into the V notch of the bottom arm. Holding the blade holder (FA-46) in your hand feed the blade through the open slot in the table top making sure the teeth are facing the front of the saw. Slide the blade holder in front of the lower arm until the blade will slide between the open notch in the lower arm. Now slide the blade holder (FA-46) back into the V notch of the lower arm. Pull the blade tightly into the V notch by pulling it through the hole in the table top with the thumb and first finger of your left hand. Place the 9/64" T handle allen wrench (ES-86) into the allen head cap screw in the upper blade holder (FA-45) and pull down the upper arm with pressure applied by your right hand while holding the T handle allen wrench (ES-86). Lower the upper blade holder over the top end of the blade until the top of the blade rests on the center of the allen head cap screw and is touching the roll pin in the middle of the holder. (Fig. 11) Tighten the allen head cap screw securely with the T handle allen wrench (ES-86).

Step 4:

Remove the 9/64" T handle allen wrench and the 'L' shaped quick change hold rod from behind the upper blade holder assembly. Tension the blade with the Cam Over handle (HA-74) by flipping it back to it's original position. To check the blade tension pluck the blade like a guitar string. You should get a crisp ping sound from the blade if it is tensioned correctly. If you don't receive a crisp ping, loosen the Cam Over handle (HA-74) by flipping it back to the blade change position and turn it like a knob, making sure the tension rod (the metal rod that holds the two arms together at the rear) remain stationary while you turn the Cam Over. Tighten only 1/2 turn at a time. Retension the Cam Over by flipping it back to the original position. Check tension.







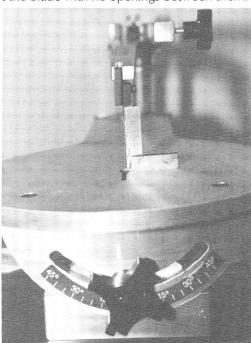
REMOVAL OF HA-04 SAW TABLE

- 1. Disconnect electrical power source.
- 2. Remove saw blade from top and bottom arms (See Blade Changing Procedure).
- 3. Loosen and remove the two 1/4" countersunk HA-79 socket head screws located at the front of the table. (See Fig. 12)
- 4. With a 7/16" end wrench loosen and remove the hex nuts from the two 1/4" carriage bolts that connect the table pivot bracket (HA-10) to the rear mounting bracket (HA-08). (See Fig. 12)
- 5. Remove the table from the saw.
 - ALLEN HEAD CAP SCREW ROLL PIN

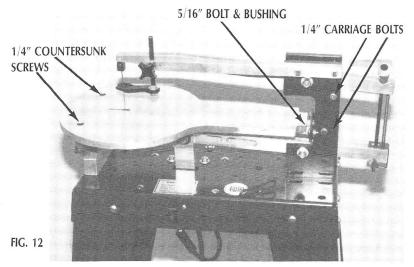
FIG. 11

LEVELING THE TABLE

- 1. Disconnect from electrical power supply.
- 2. Place a small 90° square on the table with the back edge of the beam against the blade.
- 3. Inspect blade and square. The square should fit perfectly against the blade with no openings between them. If there



- 6. Turn the pivot bracket until the carriage bolts can be reached and remove the bolts.
- Using a 1/2" end wrench loosen and remove the 5/16" bolt and bushing that connects the pivot bracket to the table. (See Fig. 12)
- 8. To install, reverse procedure.
- NOTE: Do Not over tighten the table pivot bolt. The table should tilt easily when tilt knob is loosened.



is an opening, loosen the table tilt knob (ES-42) and adjust the table tilt. (See Fig. 13)

4. When the square fits perfectly against the blade, tighten the table tilt knob. (Fig. 14)

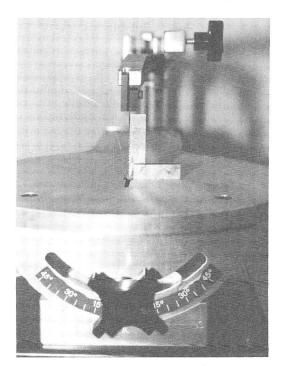


FIG. 14

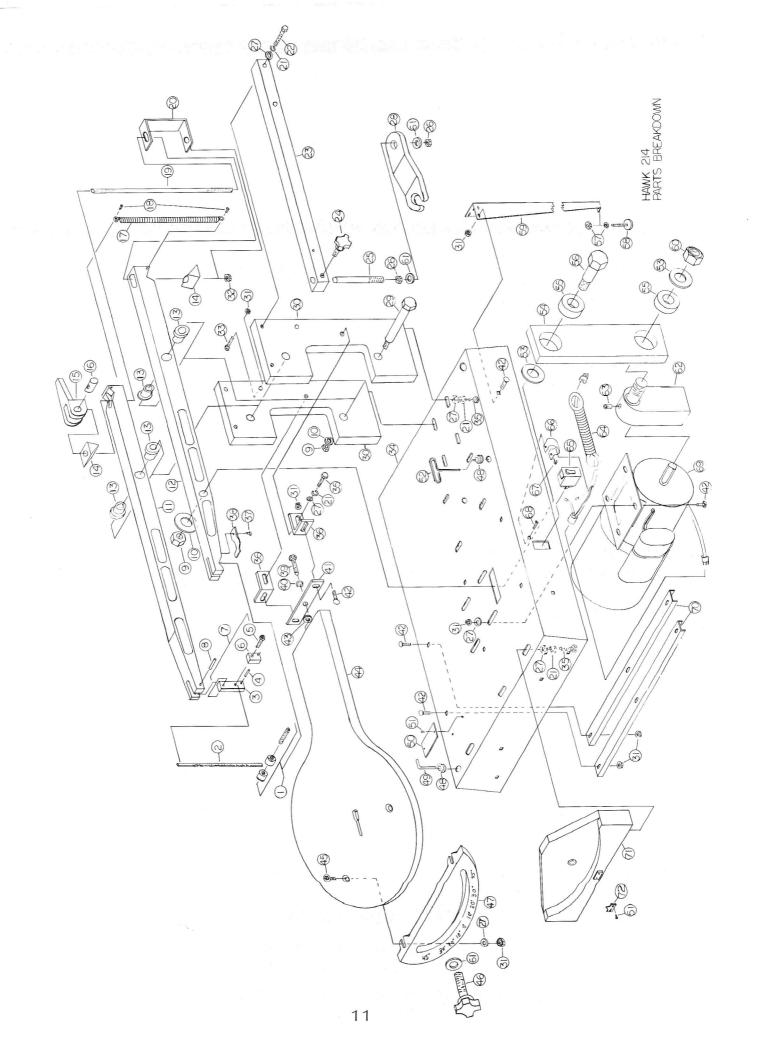
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PARTS BREAKDOWN HAWK 214

		PART#	QUANT.			PART #	QUANT.
1	Bottom Blade Holder Assembly	FA-46	1	38.	Plastic Blade Holder Clip	HA-99	1
	Blade	171 10	1		5/16-18 x 1" Bolt	RZ-181	2
	Blade Holder Arm Insert	FA-40	1	40.	5/16" Lock Washer	RZ-178	2
	$1/8'' \ge 1/2''$ Roll Pin	FA-43	1	41.	Rear Table Pivot Bracket	HA-10	1
	$8-32'' \times 1/2''$ Allen Head Screw	ES-35	1	42.	1/4-20 x 5/8" Carriage Hd Bolt	RB-99	24
	Blade Holder Side	EA-41	1	43.	Nylon Slide Spacer	RB-517	1
	Top Blade Holder Assembly	FA-45	1		Table	HA-04-Z	1
	$1/8'' \times 3/4''$ Roll Pin	FA-42	1	45.	1/4 x 3/4 Soc. Flat Hd Screw	RZ-182	2
	3/8″16 Hex Nut w/Neopreme Insert	RZ-51	3	46.	Table Tilt Thread. Knob 5/16-18 x 1″	ES-42	1
	3/8" Flat Washer	RZ-50	3		Table Tilt	HA-20-P	1
	Top Arm	HA-01	1	48.	Rubber Grommet	HA-16	2
	Bottom Arm	HA-06	1	49.	Quick Change Hold Rod	HA-65	1
	Bronze Bushings	R-369	4		Serial Tag	HA-28	1
	Connector Arm Pivot	HA-18	2		U-Drive Screws	FA-12	2
	Blade Tension Handle	HA-74	1	52.	T Handle Allen Wrench 9/64"	ES-86	1
	Round Handle Pivot	HA-77	1	53.	18 GA Spacer	HA-14	2
	Spring	FA-36	1	54.	Pittman Arm	SA-05	1
	10-32 x 1/4" Rd Hd Slotted Screw	FA-35	2	55.	Bearing	PS-07	2
	Blade Tension Rod	SH-01	1	56.	Shoulder Bolt 1/2" x 1-1/16"	HA-13	1
	Wedge Hold Bracket	HA-97	1	57.	3/8-16 Hex Nut	RZ-58	8
	1/4″ Lock Washer	RBZ-207	10	58.	Glides	ES-57	4
	1/4-20 x 1-1/4" Hex Hd Bolt	PS-80	2	59.	Leg	CD-07	4
	Hold Down Arms	HA-106-Z	1	60.	1/2" Hex Nut	HA-68	1
	Threaded Knob w/ 1/4"x 1/2" Stud	ES-40	1	61.	5/16" Flat Washer	RB-150	3
25.	Hold Down Rod	SH-12	1	62.	Crank Assembly	SA-17	1
26.	5/16-18 Hex Nut	RZ-81	2	63.	1/4" Set Screw	RZ-83	1
27.	1/4″ Flat Washer	RB-177	16		Electrical Cord Set	HA-60	1
28.	Pressor Foot	HA-104	1		Power Switch	HA-61	1
29.	1/2" x 1-3/4" Shoulder Bolt	HA-71	2		Cable Clamp	HA-76	1
30.	Rear Arm Support	HA-100	2		10-32 Hex Nut	RB-107	1
31.	1/4-20 Whiz Nut	RB-223	24		Machine Screw	RB-106	1
	1/4-20 Neopreme Lock Nut	HA-78	1		Motor	ES-44-Z	1
33.	1/4-20 x 1" Hex Hd Bolt	PS-52	1		Base Braces	HA-12	2
34.	Base	HA-02-V	1		Base Tilt	HA-21-P	1
35.	1/4-20 x 3/4" Hex Hd Bolt	RBZ-206	6	72.	Plastic Pointer	HA-101	1
	Rear Table Mounting Bracket	HA-08	2				
37.	10-32 x 1/2" Machine Screw	RB-106	1				

BLADE SELECTION

	All blades are 5" long–Order by R.B.I.	no. (Blade Pitc	h)	
RBI NO.	MATERIAL CUT/USAGE	WIDTH	THICKNESS	TPI
2/0	For extremely intricate sawing. Very thin cuts in 1/16" to 3/32" materials. Excellent for cutting wood veneer, plastics, hard rubber, pearl. Very good finish with fast cutting. Excellent for tight radius cuts.	.022″	.010″	28
///////////////////////////////////////			///////////////////////////////////////	
2	For tight radius work in thin materials 3/32″ to 1/8″ wood veneer, wood, bone, fiber, ivory, plastic. Good finish, fast cutting tight radius.	.029″	0.12″	20
///////////////////////////////////////		///////////////////////////////////////		///////////////////////////////////////
5	For close radius cutting materials 1/8" or thicker. Great for sawing hard/soft wood, bone, horn, plastics. Good general purpose cutting with a medium finish.	.038″	.016″	121/2
///////////////////////////////////////		111111111111111111111111111111111111111		///////////////////////////////////////
7	Popular sizes for cutting hard and soft woods 3/16" up	.045″	.017″	11½ 11½
9	to 2″. Also cut plastic, paper, felt, bone. Medium finish may require some sanding.	.053″	.018″	11/2
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420-R	For smooth splinter-free finish on top and bottom sides. Excellent for hard/soft wood, plywood with thickness of 1/4" or more. Fast cutting. 10	.100″	.022″	9 with 3 reverse teeth.



SPECIFICATIONS HAWK 214

Length:	26″
Width:	18″
Height:	44"
Weight:	57 lbs.
Throat Depth:	14″
Cutting Depth:	2" hard and soft woods
Length of Stroke:	13/16″
Cutting Strokes	
per minute:	1,725

ACCESSORIES

LIGHT

2LK STANDARD LIGHT

Heavy duty flexible arm, 16' long which uses a maximum 60 watt incandescent bulb with metal globe. Allows light to be put close to the work and maintain this position. Comes complete with everything to mount to your saw.

2MK MAGNIFIER LIGHT

Flexible arm light with built-in 2 to 1 magnification lens and scale to measure through the lens. Comes with bracket to attach to a work bench edge. Uses 60 watt incandescent bulb, maximum.

2RBK RUBBER BELLOWS KIT

Kit comes with Rubber Bellows, mounting brackets, hose and hardware to install on your Hawk 214 Saw. The Bellows uses the action of the arm to pump air to keep an area around the blade free of sawdust.

HOW AND WHERE TO ORDER REPLACEMENT PARTS AND ACCESSORIES

TO SPEED DELIVERY AND REDUCE ERROR OF REPLACE-MENT PARTS, ALWAYS INCLUDE THE FOLLOWING INFOR-MATION:

- 1. Give the complete identification of the machine.
 - A. Machine Name _____
 - B. Model Number _____
 - C. Serial Number _____
- 2. Give the identification of the part.
 - A. Part Number _____

B. Part Name _____

Motor Size: Drive: Work Table:

Bearing Type:

Dust Blower:

1/8 HP TEFC Direct 10-1/2" round, polished aluminum. Tilts 45°Left or Right. Sleeve Optional

6LE LEG EXTENSION KIT

Bottom mounted Leg Extension which increases the height of your saw up to six inches, with 2' increment adjustments.

HA-81 FOOT SWITCH

Switch enables user to turn saw on and off by foot, leaving the hands free. Plugs directly into switch cord and requires no wiring.

HA-85 BLADE ALIGNMENT FIXTURE

Fixture that holds bottom blade holder and aligns the blade to the center screw. Ensures proper blade installation into the bottom holder.

HA-87 BLADE HOLDER RACK

Rack mounts to base and holds up to six bottom blade holders with blades installed. Saves time when changing blades.

C.	lf	necessary,	return	the	old	part	as	а	sample.
----	----	------------	--------	-----	-----	------	----	---	---------

3. Give us an address to return the part to.

Ship to: _____

		Your Name (Please	Print)
	Address	,	
	Street	P.O. Box	Rural Route
	City		
	State	Ziµ	p
	Country	đ	
4. S	end your order to:		

You Can Reach Us

By Phone	1-620-562-3557
By Fax	1-620-562-3557
By Web	jnye@hawkwoodworkingtools.com