



## **MODEL 36 and 52 FOOT SQUARING SHEARS**

### **OPERATION, PARTS & MAINTENANCE MANUAL**



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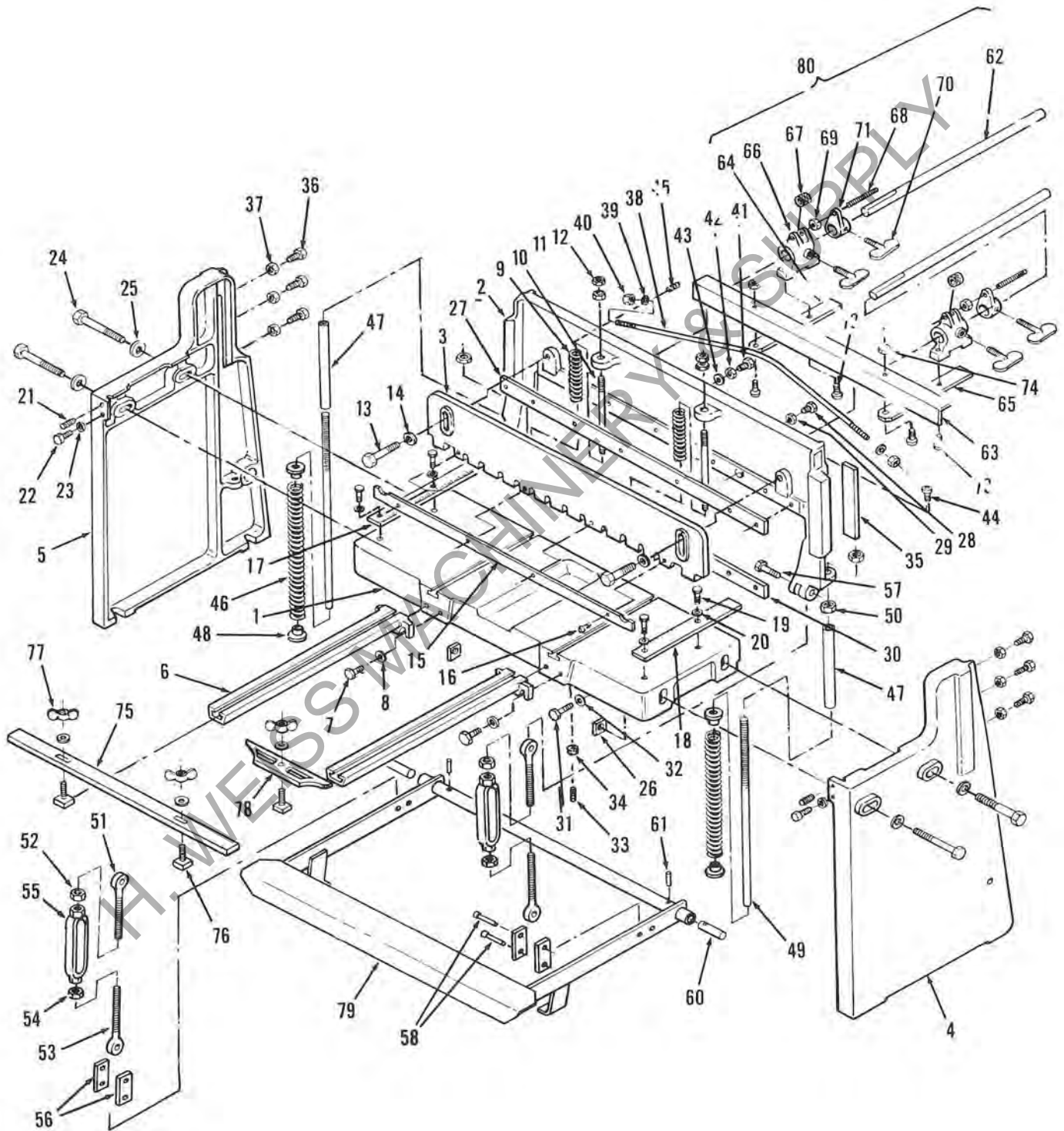
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A Family Tradition Since 1928

## Model 36 and 52 Foot Squaring Shear Parts View



## Model 36 and 52 Parts List

NO.	36	52	INDEX DESCRIPTION	QTY.
1	10101	10151	TABLE	1
2	10102	10152	CUTTER BAR	1
3	10103	10153	HOLDDOWN	1
4	10051	10051	R.H. SIDE PANEL	1
5	10052	10052	L.H. SIDE PANEL	1
6	10053	10053	FRONT ARM EXT.	2
7	05055	05055	SCREW, FRONT ARM EXT.	4
8	05673	05673	WASHER, FRONT ARM EXT.	4
9	10054	10054	SPRING, HOLDDOWN	2
10	10111	10164	STUD, HOLDDOWN SPRING	2
11	05880	05880	NUT, HOLDDOWN STUD	2
12	05907	05907	CAP NUT, HOLDDOWN STUD	2
13	05060	05060	SCREW, HOLDDOWN	2
14	05673	05673	WASHER, HOLDDOWN SCREW	2
17	10055	10055	SCALE, L.H. TABLE	1
18	10056	10056	SCALE, R.H. TABLE	1
19	05021	05021	SCREW, TABLE SCALE	4
20	05639	05639	WASHER, TABLE SCREW	4
21	05327	05327	SET SCREW, TABLE ADJ.	2
22	05035	05035	SCREW, TABLE LOCK	2
23	05670	05670	WASHER, TABLE LOCK SCREW	4
24	05075	05075	BOLT, TABLE	4
25	05676	05676	WASHER, TABLE BOLT	4
26	05925	05925	NUT, TABLE	4
27	10105	10155	KNIFE, UPPER	1
28	05033	05033	SCREW, UPPER KNIFE	7/9
29	05670	05670	WASHER, UPPER KNIFE	14/18
30	10106	10156	KNIFE, LOWER	1
31	05035	05035	SCREW, LOWER KNIFE	6/8
32	05670	05670	WASHER, LOWER KNIFE	12/16
33	05246	05246	SET SCREW, LOWER KNIFE ADJ.	6/8
34	05759	05759	NUT, LOWER KNIFE ADJ.	6/8
35	10064	10064	SHIM, C'BAR	2
36	05249	05249	SCREW, C'BAR SHIM	6
37	05762	05762	NUT, C'BAR SHIM SCREW LOCK	6
38	10107	10157	STRAIGHTENER ROD, C'BAR	1
39	05673	05673	WASHER, STRAIGHTENER ROD	3
40	05787	05787	NUT, STRAIGHTENER ROD	3
41	10112	10165	ADJ. SCREW, STRAIGHTENER ROD	1
44	05331	05331	SET SCREW, BACKGAUGE ROD	2
45	05331	05331	SET SCREW, HOLDDOWN LOCK	2
46	10302	10302	SPRING, FOOT PEDAL	2
47	15053	15053	SPRING GUIDE	2
48	15057	15057	CAP, SPRING	4
49	15055	15055	STUD, SPRING	2
50	05787	05787	NUT, SPRING STUD	8
51	10069	10069	LINKAGE BOLT, C'BAR	2
52	05827	05827	NUT, LINKAGE BOLT, C'BAR	2
54	05826	05826	NUT, STUD	8
55	10071	10071	TURNBUCKLE	2
56	10073	10073	LINK, PEDAL	4
57	06354	06354	PIN, LINKAGE, MOUNTING	2
62	10058	10058	ROD, BACKGAUGE	2
63	10110	10163	STOP, BACKGAUGE	1
64	10065	10065	R. EXT. BAR, BACKGAUGE	1
65	10066	10066	L. EXT. BAR, BACKGAUGE	1
66	10059	10059	ADJ. BLOCK, BACKGAUGE	2
67	10060	10060	ADJ. DIAL, BACKGAUGE	2
68	10075	10075	ADJ. SCREW, BACKGAUGE	2
69	05762	05762	NUT, ADJ. SCREW	2
70	10061	10061	LOCK SCREW, BACKGAUGE	4
71	10062	10062	ADJ. BRKT. BACKGAUGE	2
72	05027	05027	SCREW, EXT. BAR	2
73	05325	05325	SWIVEL BOLT	3
74	10109	05765	NUT, SWIVEL BOLT	2
75	10159	10159	STOP, FRONT MATERIAL	1
76	10074	10074	"T"-NUT	3
77	05938	05938	WING NUT, "T"-NUT	3
78	10063	10063	BEVEL GAUGE	1
80	10108	10158	BACKGAUGE ASSEMBLY	1

## FOREWORD

This manual has been prepared for the owner and operators of the TENNSMITH Model 36 and 52 Shears. Its purpose, aside from operation instruction, is to promote safety through the use of accepted operating procedures. Read all instructions thoroughly before operating your shear.

Also contained in this manual is the parts list for your shear. It is recommended that only TENNSMITH factory authorized parts be used for replacement parts.

## WARRANTY

Your shear has a three year limited warranty from the date of purchase. The terms of the warranty are stated on the warranty registration card shipped with your machine. Please complete and return this card to activate your warranty.

## SAFETY INSTRUCTIONS

1. Know the safety and operating instructions contained in this manual prior to operation of this shear. Become familiar with and understand the hazards and limitations of this shear. Always practice safety.
2. Wear approved eye safety protection, such as safety glasses or goggles, etc., when operating the shear to protect your eyes.
3. Protective type footwear should be worn, and jewelry such as rings, watches, necklaces, etc., should be removed prior to operation of this shear.
4. **Do not remove the front hold-down guard (Index # 3). This is a protective device. If the hold-down is inoperable, immediately disconnect the power and lock the main power to the machine, and contact Tennsmith or your authorized distributor for a replacement part.**
5. **Keep the hold-down (Index #3) at the minimum gap required to feed the material into the shear. The gap should never be higher than 3/16" from the table.** If you have questions regarding the Hold-down, please consult the factory.
6. Always keep hands clear of the blade.
7. Do not misuse the shear by using it for other than its intended purpose.
8. Never exceed the rated capacity of this machine.
9. Keep the work area clear and clean to avoid tripping or slipping.
10. Any malfunction or abnormality pertaining to this machine should be reported to the maintenance supervisor immediately.





## **RECEIVING THE SHEAR**

Examine the shear and accessories package for evidence of any possible damage sustained during transit. Any damage should be reported to your distributor immediately.

## **INSTALLING THE SHEAR**

Carefully remove the shear from the shipping pallet. Locate the shear in a well-lighted area on a solid level floor. Use lag screws or bolts with expandable shields or similar holding devices through the mounting feet, located on the bottom of the side panels.

Place an accurate machinist level on the table top, and check the level of the machine in both directions. Use metal shims between the floor and the shear mounting surface to adjust the level. After the machine is level, tighten the mounting bolts.

**Periodically, recheck the unit for levelness.**

**NOTE: Proper levelness greatly affects the performance of your shear, it is very important to ensure your machine is level prior to operation.**

## **OPERATION INSTRUCTIONS**

The mild steel capacity of the Model 36 and 52 shear is 16gauge. Included in the manual is a standard shearing, bending, and forming conversion chart for various materials including Aluminum, Stainless, and Plastics. If you have any capacity related questions on materials that do not appear on the chart, please contact Tennsmith technical support to help determine the exact capacity ratings.

**NEVER ATTEMPT TO SHEAR ANY MATERIAL GREATER THAN THE MAXIMUM RATING FOR YOUR SHEAR.**

The 36 and 52 is a fixed angle designed machines. Reducing the maximum width of your material does not increase the capacity rating of this shear.

**Never attempt to shear any material which would be less than a ½" cut across the full length of the table under full capacity.**

## **BLADE GAP ADJUSTMENT**

The factory setting for the gap between the upper and lower blade is .002. This setting was achieved using a piece of shim stock. However, if this is unavailable, the thickness of news print will approximate this dimension. The factory setting is the optimal clearance for the entire range of material likely to be sheared on this machine. Different materials and thickness may require a larger or slightly smaller clearance. If you have any specific questions regarding optimal blade gap, please consult Tennsmith.

To begin, loosen the four bolts (24) securing the table (1) to the side panels (4, 5). Pull the table towards you and depress the foot pedal (79) fully. Standing on the foot pedal, start on the left hand side (facing) of the shear by snugging the table bolts. Next, insert the shim stock between the upper and lower blades. Tighten the table adjusting screw (21) until the shim is held fast between the blades. Then, keeping upward tension on the shim stock, progressively tighten the table locking screw (22) until the shim stock is freed of pressure and can be removed. Retighten the table bolts and repeat the procedure on the opposite side of the shear.

After completing alignment, check the entire length of the blades for proper clearance using your shim stock. You may find that you either have too much or not enough clearance in the center of the blades. This adjustment is accomplished by increasing or decreasing pressure on the bow adjustment bolt (41) located at the rear of the cutter bar.

**Note: A properly aligned shear will produce a scissor like sound when the blades transcend and will leave a minimal burr on sheared stock.**

## **CUTTER BAR ADJUSTMENT**

The cutter bar (2) should move freely throughout its range of travel without binding. This should be the case with a new shear. If the shear does bind, recheck for levelness.

The gibbs should be adjusted for snug yet nonbinding movement. To accomplish this, loosen all six gibb screws (36). Beginning at the right hand side of the shear, depress the foot pedal fully and lock the center gibb screw so that the cutter bar remains down. Then, gradually loosen the screw until the cutter bar returns to its upright position. Proceed to back the screw off an additional quarter turn and lock the jam nut (37) in place. Continue by repeating this procedure for the remaining gibb screws.

Cutter bar lift is controlled by the amount of pressure exerted by the pedal springs (46). Appropriate tension was applied to the springs at the factory. However, over a period of years the springs may fatigue slightly and require additional compression.

## **LINKAGE ADJUSTMENT**

The linkage on your TENNSMITH shear is comprised of two turnbuckle assemblies (55). Rotation of the turnbuckles is the means by which blade rake and pedal height is set. There should be no need for this adjustment on a new shear.

### **Rake angle settings:**

#### **MODEL 36**

Use a marker to mark the shear bed 2 inches from the right side edge of the table. Next, measure over 32 inches from the right side edge of the table and make another mark. Starting at the right hand side (facing the machine) at the designated mark on the table, rotate the turnbuckle (55) until the distance between the top and bottom blades is approximately 3/8 of an inch. At the opposing end, repeat the procedure allowing 1 3/4 inches clearance between the upper and lower blades. After you have the desired clearance between the upper and lower blades slightly adjust the turnbuckles so that they have an equal amount of tension. That is, if one turnbuckle has more play or lost motion in it than the other, it should be readjusted accordingly. Once the rake has been set and equal tension verified between the turnbuckles, retighten the jam nuts (54) and lock the turnbuckles in place.

#### **MODEL 52**

Use a marker to mark the shear bed 2 inches from the right side edge of the table. Next, measure over 48 inches from the right side edge of the table and make another mark. Starting at the right hand side (facing the machine) at the designated mark on the table, rotate the turnbuckle (55) until the distance between the top and bottom blades is approximately 3/8 of an inch. At the opposing end, repeat the procedure allowing 1 3/4 inches clearance between the upper and lower blades. After you have the desired clearance between the upper and lower blades slightly adjust the turnbuckles so that they have an equal amount of tension. That is, if one turnbuckle has more play or lost motion in it than the other, it should be readjusted accordingly. Once the rake has been set and equal tension verified between the turnbuckles, retighten the jam nuts (54) and lock the turnbuckles in place.

**FOOT PEDAL ADJUSTMENT:** Foot pedal lift is similarly adjusted through turnbuckle rotation. Lift adjustment serves two purposes. It facilitates an acceptable working height for pedal operation and insures proper blade penetration across the working length of the shear. First, secure the top gibb screw on each side of the shear to maintain the blade rake angle. Then, adjust the foot pedal to what would appear to be an appropriate return lift.

**NOTE:** When gibbs are loosened a slight degree of additional lift will be achieved.

Once you have an approximate setting, loosen the top two gibb screws and depress the foot pedal. Examine the L.H. side of the machine to determine that the top blade does indeed transcend the bottom blade by at least 1/8 of an inch. If this is the case, tighten the jam nuts on the turnbuckles themselves or your rake alignment will be distorted. Should the penetration be less than satisfactory, retighten the gibbs to maintain rake and adjust the turnbuckles for additional pedal lift. This will allow for deeper penetration. Reverse the procedure for opposite circumstances.

When adjusting the turnbuckles, be certain that both linkages have the same amount of tension applied to each. That is, if one turnbuckle has more play or lost motion in it than the other, it should be readjusted accordingly.

As an additional point, it should be noted that there are two leverage holes provide in the foot pedal arms for connecting the linkage assembly. Your shear was shipped with the pins in the uppermost holes and should supply adequate leverage for shearing material within the machine's rated capacity. However, if you will be operating the shear at its peak capacity, moving the linkage pins to the lower of the two holes will give you some additional leverage.

## **HOLD-DOWN ADJUSTMENT**

**CAUTION: THIS SHEAR SHOULD NOT BE OPERATED WITHOUT THE HOLDDOWN IN PLACE AND PROPERLY ALIGNED.**

The hold-down (3) is designed to engage the material before the blades yet allow only minimal clearance between the guard's feet and the table surface. **The gap between the hold-down feet and table surface should never be above 3/16" of an inch.** The gap between the hold-down and the table is controlled by turning the nut on the hold-down studs (11). Clockwise rotation will increase clearance; counter clockwise turns will decrease the gap.

The guard should be held snug against the milled pads on the cutter bar and not feel loose. You must be careful, however, that the hold-down bolts (13) are not so tight as to bind the guard when the cutter bar is in the down position. Properly aligned, the bolts will snug but still allow rotation of the hold-down screw washers (14). At the rear of the cutter bar you will find two tapped holes wherein hold-down jam screws (45) are located. Once you have applied proper tension to the hold-down screws, tighten the jam screws to lock alignment in place. (Note: The milled pads on the front and rear of the hold-down should be greased periodically to maintain proper action.

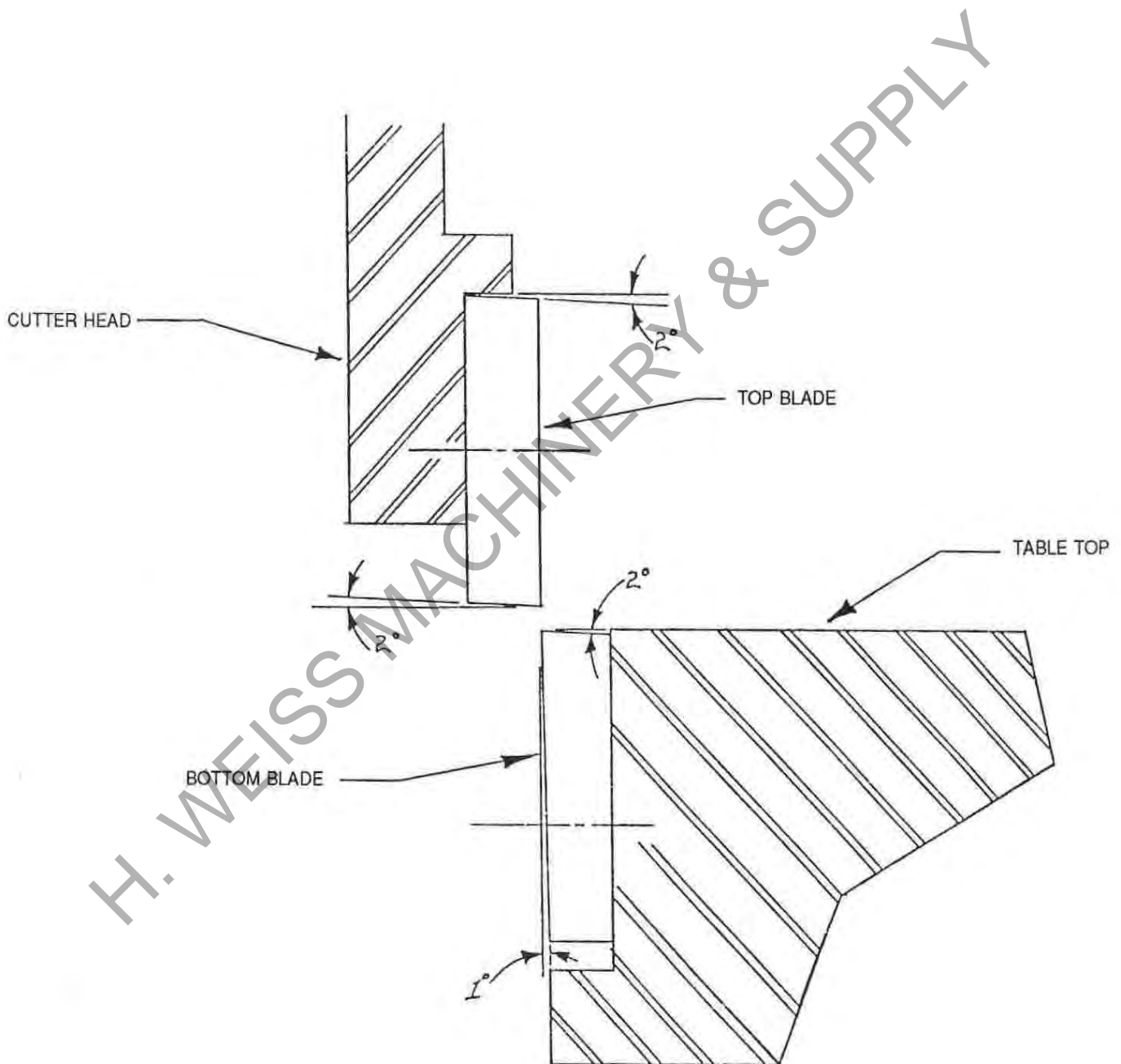
## **BACK GAUGE ADJUSTMENT**

Slide back gauge rods (62) through the adjustment blocks (66) and brackets (71). Mount the rods in the holes found at the rear of the cutter bar. Move the gauge angle (63) up the rods until it contacts with the lower blade. Observe the pointers attached to the adjustment blocks and adjust the rods in or out until the embossed scales read zero on the pointers. Tighten the set screws (44) to lock the rods in place.

To attain a particular setting, loosen the four lock screws (70) and slide the gauge to an approximate position. Fine tune adjustments are accomplished by locking the screws of the two adjustment brackets (71) while keeping those of the blocks (66) loose. The adjustment dial (68) can then be used to position the gauge in or out.

## **SHARPENING BLADES**

Your TENNSMITH shear features "Tri-Action" ground blades. The upper blade has two cutting edges which are ground with a 2 degree edge relief. The upper blade can be turned over to expose the new cutting edge. It can be sharpened on a surface grinder by grinding both wide sides to the blade. The lower blade has one cutting edge with a 2 degree cutting edge relief and a 1 degree face relief. It can be sharpened on a surface grinder by grinding the wide side of the blade having the 1 degree relief. See Figure 2). Blade sharpening service is available from the factory.





## MACHINE SPECIFICATIONS



Maximum shearing capacity, mild steel  
 Maximum shearing capacity, stainless steel  
 Maximum cutting length  
 Back gauge range  
 Front gauge range  
 Floor space, gauges in position  
 Overall dimensions, less gauges, LxWxH  
 Shipping weight

### Model 36

16 gauge / 1,6mm  
 20 gauge / 1,0mm  
 52-1/4 in. / 1327mm  
 30 in. / 762mm  
 37 in. / 940 mm  
 45 x 80 in. / 1143 x 2032 mm  
 46-1/4 x 24 x 42 in. / 1181 x 686 x 1067 mm  
 700 lbs. / 317.5 kg



Maximum shearing capacity, mild steel  
 Maximum shearing capacity, stainless steel  
 Maximum cutting length  
 Back gauge range  
 Front gauge range  
 Floor space, gauges in position  
 Overall dimensions, less gauges, LxWxH  
 Shipping weight

### Model 52

16 gauge / 1,6mm  
 20 gauge / 1,0mm  
 52-1/4 in. / 1327mm  
 30 in. / 762mm  
 37 in. / 940 mm  
 60 x 80 in. / 1524 x 2032 mm  
 61 x 25 x 42 in. / 1550 x 915 x 1067 mm  
 950 lbs. / 431 kg

### APPROXIMATE SHEARING, BENDING AND FORMING CAPCITIES FOR VARIOUS MATERIALS COMPARED TO MILD STEEL

Mild Steel Capacity	20ga.	18ga.	16ga.	Mild Steel Capacity	20ga.	18ga.	16ga.
NON-FERROUS METALS				FERROUS METALS			
Aluminum				Iron-dead soft			
1100-0, 2024-0	.070	.090	.125	Steel low carbon	20ga.	18ga.	16ga.
5052-0, 6061-T4	.070	.090	.125	1074, 1095 C.R. Spring Steel	24ga.	22ga.	20ga.
2024-T3, 5052-H34	.048	.063	.090	Hot Rolled	20ga.	18ga.	16ga.
5086-H36, 6061-T6	.048	.063	.090	Low carbon Cold Rolled	20ga.	18ga.	16ga.
Copper and Alloys				Stainless Steel Annealed	24ga.	22ga.	20ga.
Electrolytic Copper	18ga.	16ga.	14ga.	OTHER MATERIALS			
Bronze Commercial	18ga.	16ga.	14ga.	Plastics			
Brass 70-30	18ga.	16ga.	14ga.	ABS Compounds .120	.150	.200	
Nickel Alloys				Polycarbonate	.075	.105	.125
Inconel 600	24ga.	22ga.	20ga.	Printed Circuit Boards			
Monel R405	24ga.	22ga.	20ga.	Copper-Clad			
Nickel 200A Annealed	24ga.	22ga.	20ga.	Epoxy Laminate	.086	.115	.150
Zinc as Rolled	20ga.	18ga.	16ga.				

#### Approximate Gauge Equivalents

Gauge	28	26	24	22	20	18	16	14	12	11	10
Inches	.015	.018	.024	.030	.036	.048	.060	.075	.105	.120	.135
Millimeters	.38	.46	.61	.76	1.00	1.25	1.60	2.00	2.70	3.05	3.50



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