

3889560 REEL ALIGNMENT GAGE

OPERATING INSTRUCTIONS AND PARTS LISTS



WARNING

You must thoroughly read and understand this manual before operating the equipment, paying particular attention to the Warning & Safety instructions.

Safety Awareness Symbols are inserted into this manual to alert you to possible **Safety Hazards**. Whenever you see these symbols, follow their instructions.



The **Warning Symbol** identifies special instructions or procedures which, if not correctly followed, could result in personal injury.



The **Caution Symbol** identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of equipment.

1. **KEEP GUARDS IN PLACE** and in working order.
2. **REMOVE WRENCHES AND OTHER TOOLS.**
3. **KEEP WORK AREA CLEAN.**
4. **DON'T USE IN DANGEROUS ENVIRONMENT.** Don't use Grinder in damp or wet locations. Machine is for indoor use only. Keep work area well lit.
5. **KEEP ALL VISITORS AWAY.** All visitors should be kept a safe distance from work area.
6. **MAKE WORK AREA CHILD-PROOF** with padlocks or master switches.
7. **DON'T FORCE THE GRINDER.** It will do the job better and safer if used as specified in this manual.
8. **USE THE RIGHT TOOL.** Don't force the Grinder or an attachment to do a job for which it was not designed.
9. **WEAR PROPER APPAREL.** Do not wear loose clothing, gloves, neckties, or jewelry which may get caught in moving parts. Nonslip footwear is recommended. Wear protective hair covering to contain long hair.
10. **ALWAYS USE SAFETY GLASSES.**
11. **SECURE YOUR WORK.** Make certain that the cutting unit is securely fastened with the clamps provided before operating.
12. **DON'T OVERREACH.** Keep proper footing and balance at all times.
13. **MAINTAIN GRINDER WITH CARE.** Follow instructions in Service Manual for lubrication and preventive maintenance.
14. **DISCONNECT POWER BEFORE SERVICING,** or when changing the grinding wheel.
15. **REDUCE THE RISK OF UNINTENTIONAL STARTING.** Make sure the switch is OFF before plugging in the Grinder.
16. **USE RECOMMENDED ACCESSORIES.** Consult the manual for recommended accessories. Using improper accessories may cause risk of personal injury.
17. **CHECK DAMAGED PARTS.** A guard or other part that is damaged or will not perform its intended function should be properly repaired or replaced.
18. **NEVER LEAVE GRINDER RUNNING UNATTENDED. TURN POWER OFF.** Do not leave grinder until it comes to a complete stop.
19. **KNOW YOUR EQUIPMENT.** Read this manual carefully. Learn its application and limitations as well as specific potential hazards.
20. **KEEP ALL SAFETY DECALS CLEAN AND LEGIBLE.** If safety decals become damaged or illegible for any reason, replace immediately. Refer to replacement parts illustrations in Service Manual for the proper location and part numbers of safety decals.
21. **DO NOT OPERATE THE GRINDER WHEN UNDER THE INFLUENCE OF DRUGS, ALCOHOL, OR MEDICATION.**

OPERATING INSTRUCTIONS

UNPACK CARTONS

Remove all items from the carton and sort out on a table. Check all items against the exploded view drawings in the back of the manual to ensure that all items were shipped properly. If any problems occur, refer to the shipping and receiving instructions included in the manual packet.

DIAL INDICATOR SET UP FIXTURE

The dial indicator is made up of the following components.

(See Fig. 1)

1. Gage Base Locator with Rail Containing Pins
2. Locking handle
3. Gage slide weldment
4. Set up Gage Slide
5. Indicator Rod
6. Tension Spring Rod
7. Indicator Stop Bar
8. Dial Indicator with a .001 scale and .100 scale

(See Fig. 2)

DIAL INDICATOR SETTING

1. Remove the dial indicator assembly from carton.
2. Remove anvil on dial indicator. Mount dial into the setup gauge slide. Remount anvil. Adjust dial indicator so anvil can be fully depressed without touching the gauge slide and tighten set screw in casting to firmly mount dial indicator.



Do not overtighten, or damage or malfunction of the dial indicator may occur.

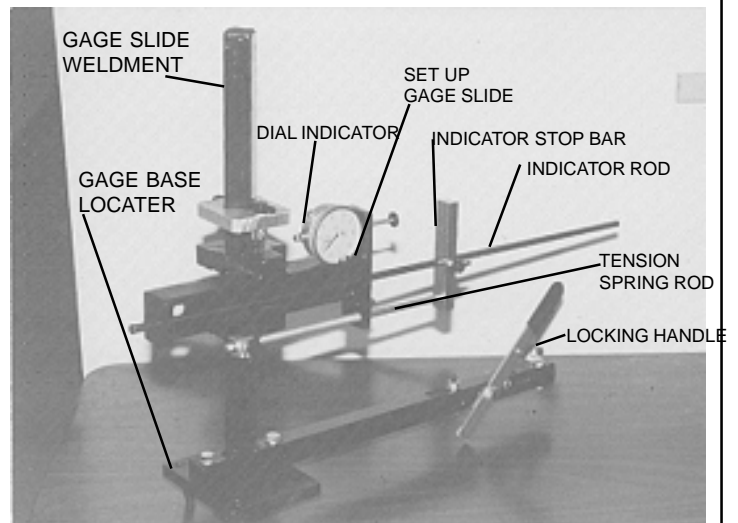


Fig. 1

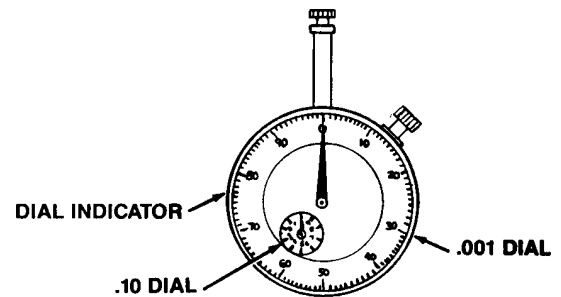


Fig. 2

OPERATING INSTRUCTIONS

REEL ALIGNMENT USING THE DIAL INDICATOR SET UP FIXTURE

A. Position the grinding wheel assembly in the middle of 36" or wider reels or to one side of the grinder on smaller reels, so that you can touch both sides of the reel with the set up fixture without moving the grinding wheel assembly from side to side. (See Fig. 4)

B Generally, it is preferred to have both overhead clamp rod adjusting knobs (see Fig. 5) loose to allow the mower assembly, which is mounted on the mower support bar, to move freely when doing horizontal and vertical adjustments. Due to the configuration of some mower assemblies this cannot always be done. Some mowing units rely on the overhead clamp rods to support the unit and give rigidity. In these cases, the overhead clamp rod on the non-moving end of the mower support bar (right side from operator position) must be tight and the movable end (left side) overhead clamp rod can be loose.

The overhead clamp rods will generally be used as described below:

1. If the mowing unit is clamped in the V-brackets and the ground roller is firmly resting in the roller support clamps, then both overhead clamp rod adjusting knobs can be loose.
2. If the mowing unit is mounted in centers and the ground roller is resting firmly in the roller supports, then generally both of the overhead clamp rod adjusting knobs can be loose. The exception is when mounted in centers and because the geometry does not offer enough stability or rigidity, then the overhead clamp rod on the fixed end (right side in the operator's position) should be kept tight.
3. If the mowing unit is mounted in centers and only being stabilized by the overhead clamp rods, then the clamp rod on the fixed end must be kept tight.

This area will be covered in greater detail in the individual setup sheets for each mowing unit which are available separately from this manual.

C. Loosen the locking knob on the pivot assembly located on the left side of the square mounting bar so that it can be adjusted in both the vertical and horizontal plane. (See Fig. 6)

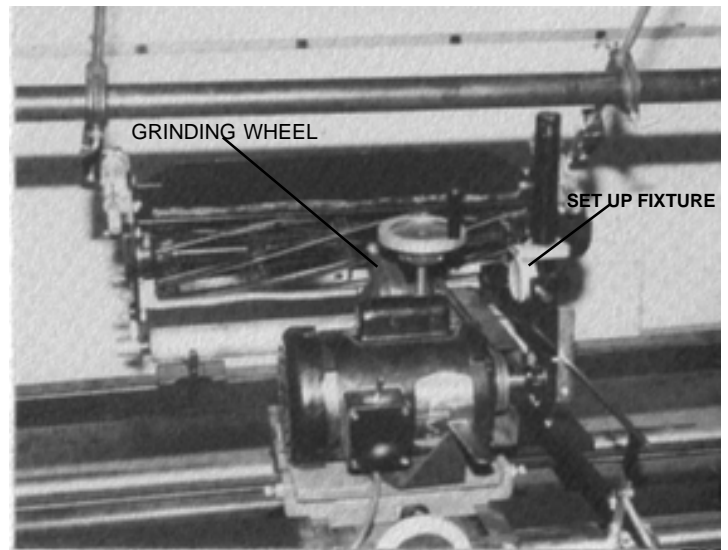


Fig.4

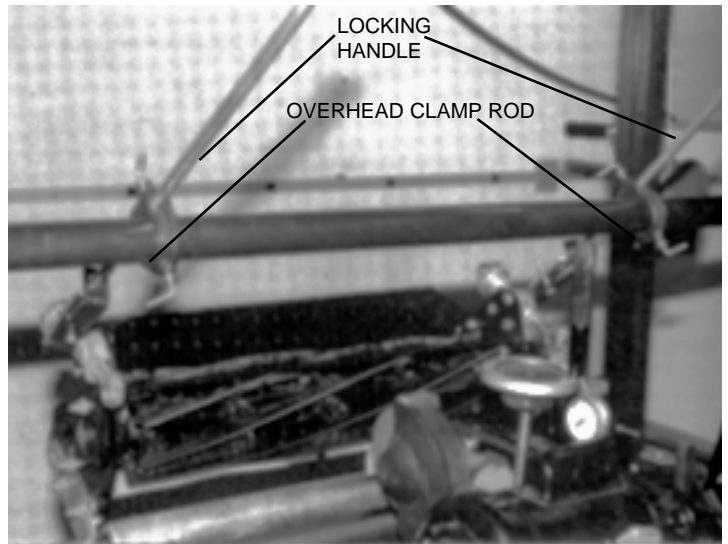


Fig. 5

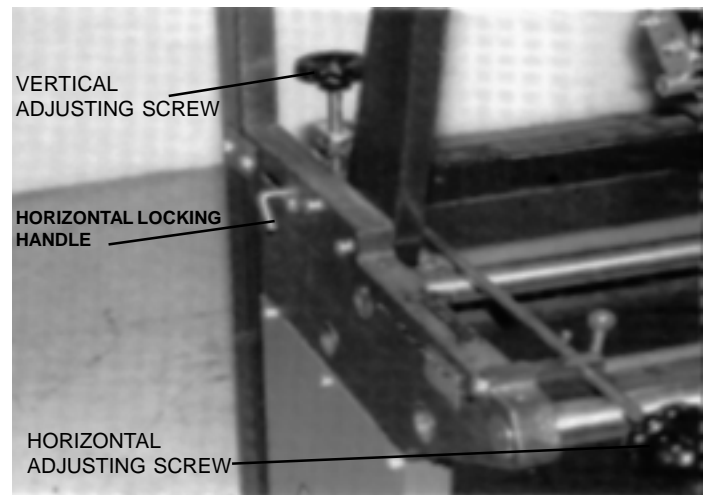


Fig. 6

OPERATING INSTRUCTIONS

ALIGNING REELS IN THE VERTICAL PARALLELISM PLANE

- A. Place the set up fixture approximately 2" from the right side of the reel and lock it to the front and back rails of the base.
- B. Raise the indicator slide casting on the vertical support so that the indicator rod can be extended over the center shaft of the reel. (See Fig. 9 and 10)
- C. Lower the indicator slide by turning the vertical fine adjustment knob B until the alignment rod lightly touches the top of the reel center shaft. (See Fig 8,9, & 10)
- D. Pull rod back and lock knob C (See Fig. 8). Move the alignment gage to the left end of the reel (see Fig. 12). Move the setup gauge to the other side of reel, same distance from end. Loosen Knob C and extend alignment rod over reel shaft.
- E. If the left side is lower than the right, turn the vertical adjusting screw in the pivot assembly clockwise raising the mounting bar and the reel until the center shaft of the reel lightly touches the extended indicator rod. (See Fig. 13)

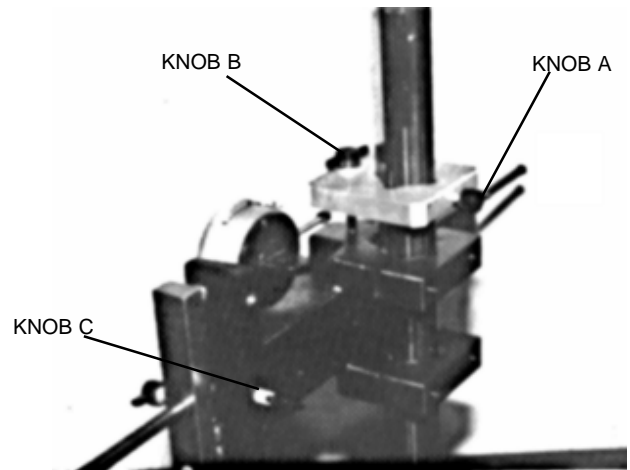
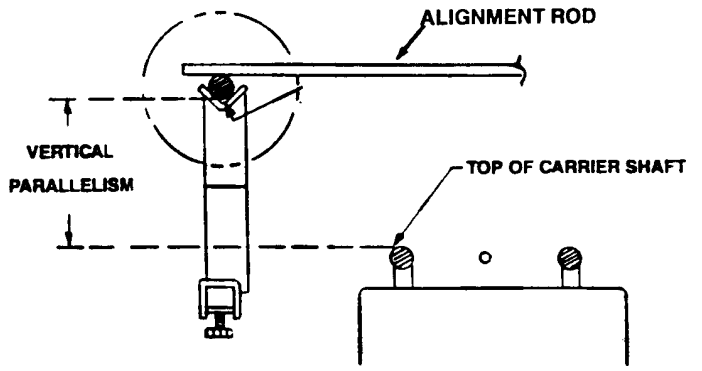


Fig. 8

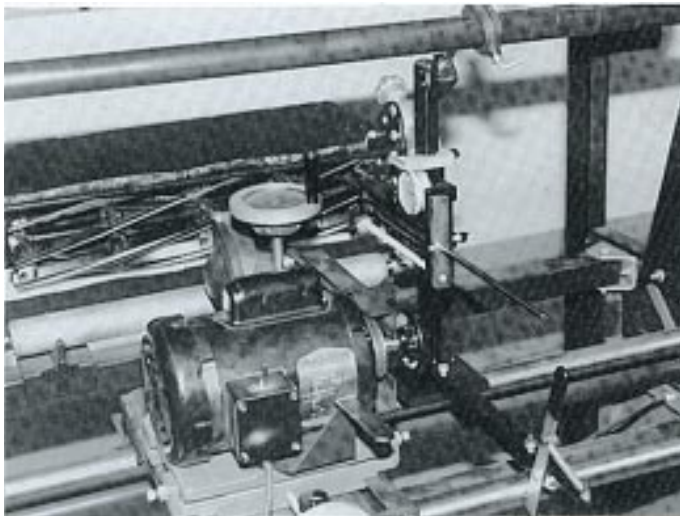


Fig. 9

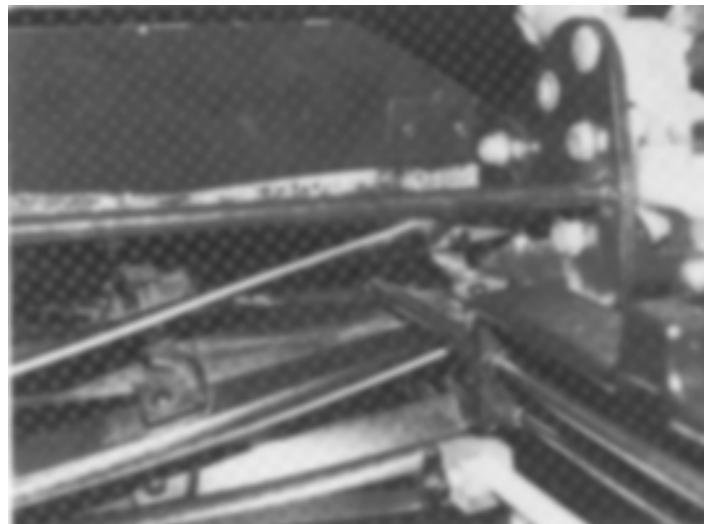


Fig. 10

OPERATING INSTRUCTIONS

VERTICAL ALIGNMENT - CONTINUED...

F. Place a mark on the knob so you know where you are starting from. (See Fig. 14) Now turn the vertical adjusting screw 1-1/2 more revolutions. This 1-1/2 revolution is to compensate for the fact that as you adjust the left side, the right side is also moving at a ratioed amount. This should almost align your reel in the vertical parallelism plane. (See Fig. 14)

G. Move the alignment fixture back to the right hand side of the reel and re-adjust the alignment rod so that it lightly touches the top of reel center shaft.

H. Finally move it back to the left side or make sure the reel is in perfect vertical position. If not, move reel up or down so that it just touches alignment rod on both sides. When it does, no further alignment is necessary.

I. If the left side of the reel is found to be higher than the right, lower the mounting bar and reel until alignment rod lightly touches the top of the reel center shaft and then turn the vertical adjusting screw an additional 1-1/2 revolutions. This 1-1/2 revolution is to compensate for the fact that as you adjust the left side, the right side is also moving at a ratioed amount. This should line reel up fairly accurately on both sides. Then continue with procedures found in "G" and "H".

J. Now lock the vertical adjusting screw in place with locking plate. (See Fig. 13 & 14)

NOTE: This alignment is not as critical as the horizontal plane, but care should be taken on all reel setups. The accuracy need only be approximately .010.

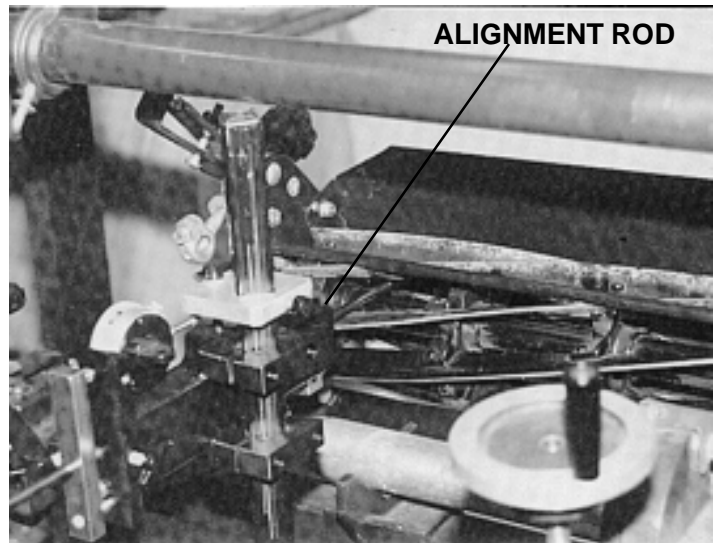


Fig. 12

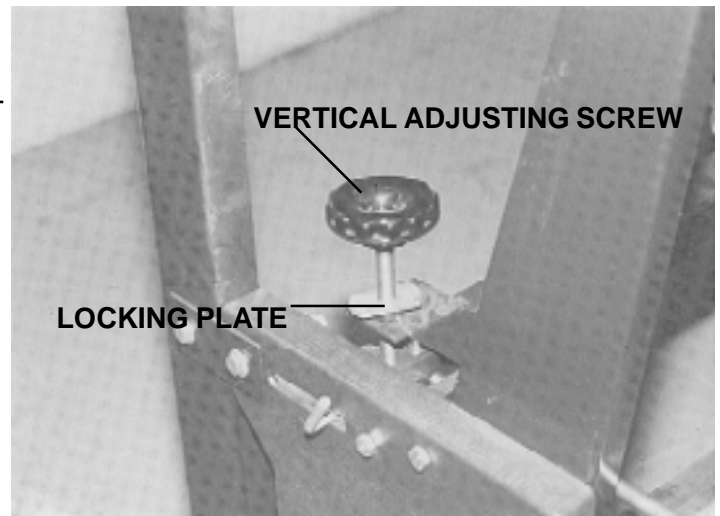


Fig. 13



Firmly tighten the vertical locking plate. Any loosens will adversely affect grind quality.

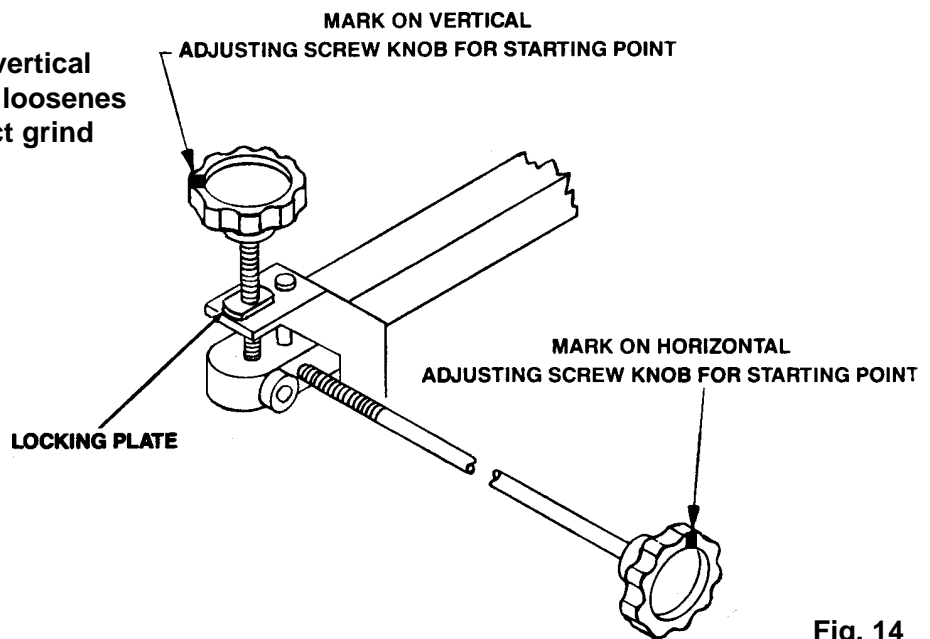


Fig. 14

OPERATING INSTRUCTIONS

ALIGNING REELS IN THE HORIZONTAL PARALLELSM



This is a critical set up and care should be taken when making these adjustments. If reel is out of position in the horizontal plane, it will be ground cone shaped

- A. Place set up gage on the right hand side of reel approximately 1" from the end. (See Fig. 16)
- B. Lower the indicator slide casting on the vertical support so the indicator rod can make contact with the center of the reel shaft within approximately 1/8" and lock knob A. (See Fig. 8) Center shaft should be clean and free of rust where rod makes contact. Now fine adjust using knob B (See Fig. 8) until the alignment rod is at the center of the reel.
- C. Now loosen knob C (See Fig. 8) on the indicator stop bar. Holding the indicator rod firmly against the reel shaft, move the indicator stop bar back, until no contact is made and then an additional 1/2". This will set the plunger at about its midpoint, allowing it to move in both directions. (See Fig. 18)
- D. Now set the outer dial indicator to the "0" position. Read and note the position of the smaller (.100) dial. You must know this reading when setting up the other side. More detailed explanation will follow. (See paragraph "F" for example - STEP 1.) Pull back and lock with knob C. (See Fig. 8)
- E. Move the alignment gage to the left side of the reel carefully retracting the indicator rod so as not to damage or change setting. Set indicator rod on the same position of the reel as on the other side, that is 1" from the end and centered on the shaft. (See Fig. 17) Now read the dial indicator to determine the distance the reel is out of position. (See paragraph "F" for example - STEP 2.)

When you pull the indicator rod back, there is a T-knob ("C") to snug up so you do not have to hold the rod in the back position.

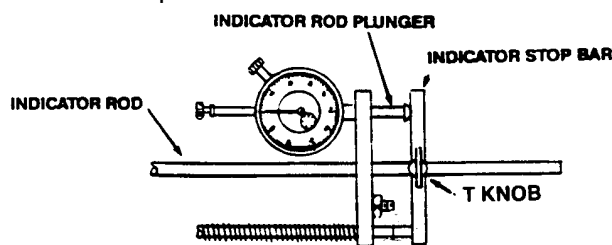


Fig. 18

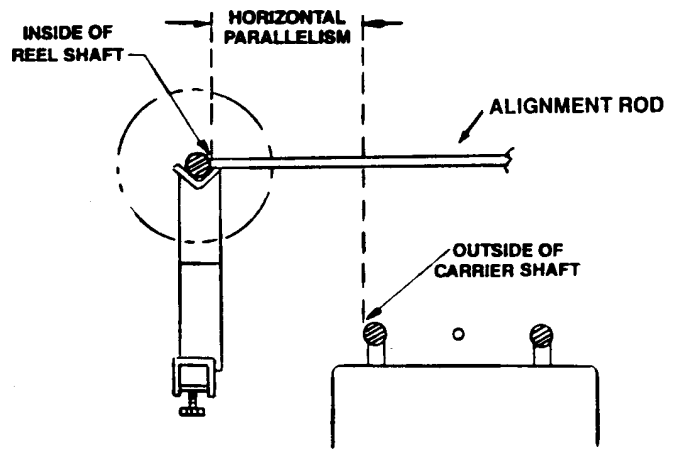


Fig. 15

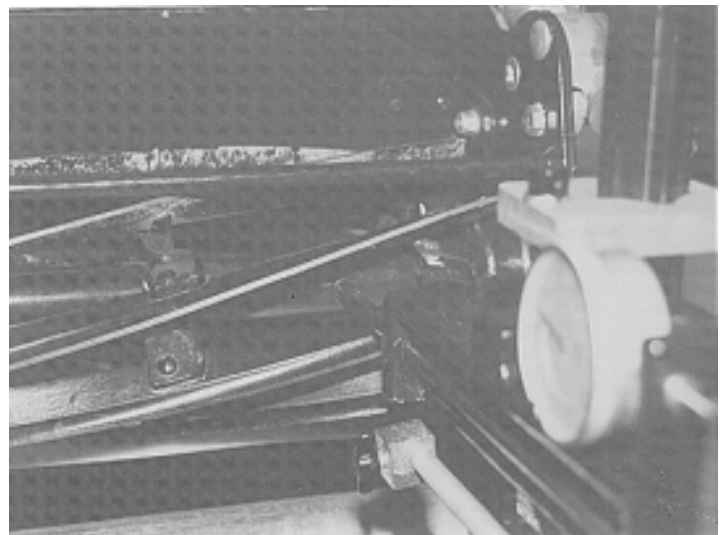


Fig.16

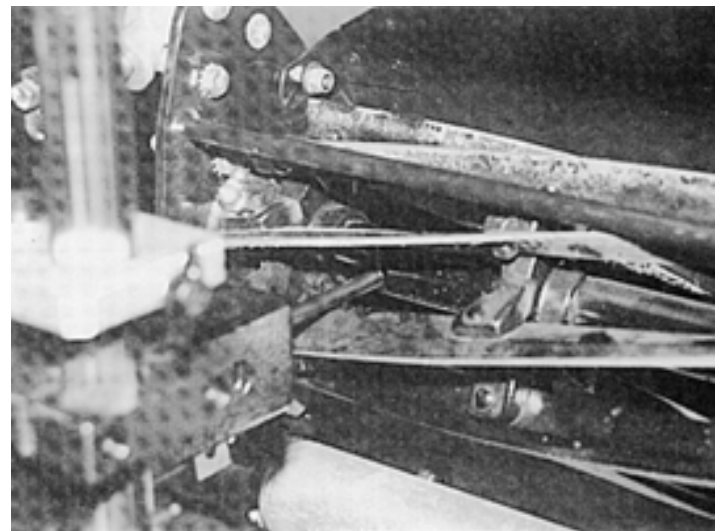


Fig. 17

OPERATING INSTRUCTIONS

ALIGNING REELS IN THE HORIZONTAL PARALLELISM...CONTINUED

F. The following example shows how to read the dial indicators. One revolution of large dial is equal to .100. This is indicated on the small dial by it increasing or decreasing one number (Example = 5 to 6 is .100)(See Fig. 19A & 19B)

STEP 1. Read the dial indicator on the right side of reel shown as Position A in Fig. 20. Now read dials as shown in Fig. 19A.

Set Large Dial.....	Large Dial	Small Dial
	0	5

NOTE: The large dial was set at "0" in Step D.

STEP 2. Move the set up stand to the left side as shown in Position B in Fig. 20 and read the dials as shown in Fig. 19B.

Note Rotation.....	Large Dial	Small Dial
	80 (CW)	6 (CCW)

STEP 3. Read the difference between each position. Shown as **C DIAL INDICATOR DIFFERENCE READING** in Fig. 20.

Large Dial.....	.080
Small Dial.....	.100
So "C" Equals.....	.180
Reference .680 - .500 =	.180

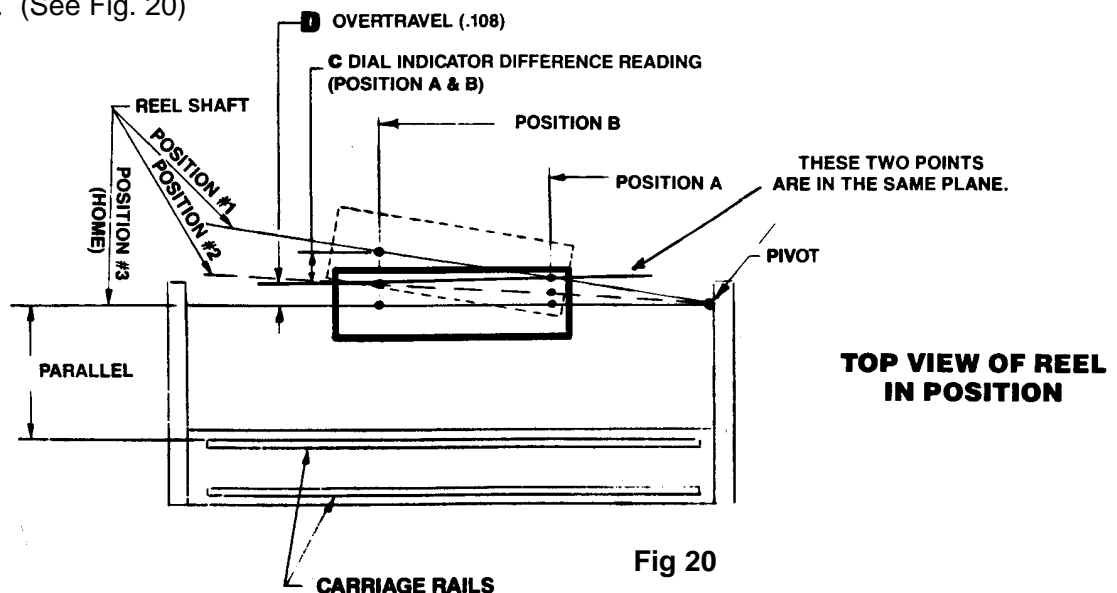
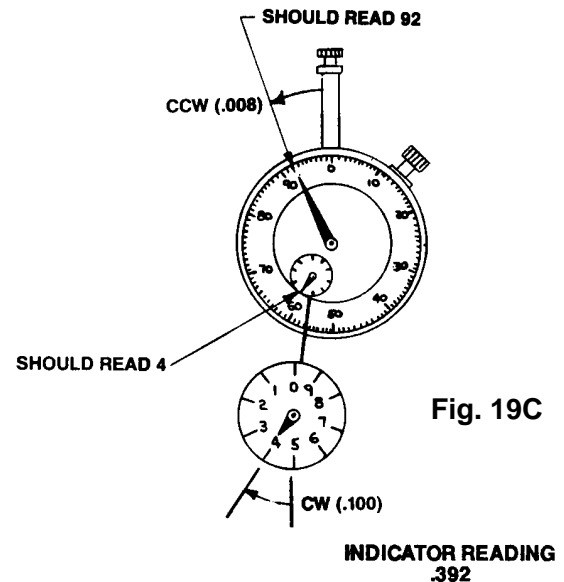
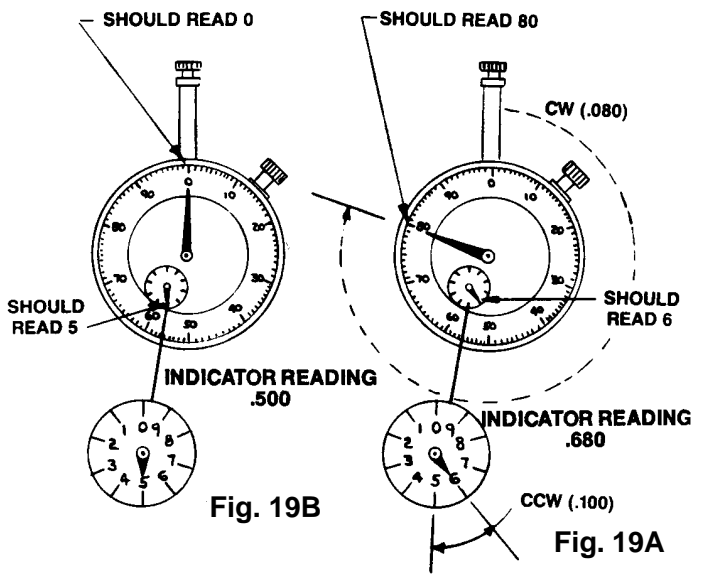
STEP 4. To establish the overtravel distance "D" in Fig. 20, you do as follows:

First, you must compensate for the left side being out .180 by adjusting the horizontal adjustment to "0". Fig. 19A. As you adjusted the left side to "0", the right side was moving. To compensate for this, take 1/2 of "C" plus 10% of "C".

Example:

1/2 of "C" (.180)	=	.090
10% (.10) x "C" (.180)	=	.018
so "D" equals .090+ .018 or		.108

The reason for this is that the square mounting bar pivots on one end and is adjusted on the opposite end. Anytime the adjusting end is moved to change the position B dimension, the position A dimension is also changing at a ratio to position B. By over compensating at the adjusting end you will compensate for this movement and get the reel aligned much faster. (See Fig. 20)



OPERATING INSTRUCTIONS

ALIGNING REELS IN THE HORIZONTAL PARALLELISM..CONTINUED

G. To adjust reel position first determine the direction the reel has to move for alignment. The direction that the reel will have to be moved can be determined by pulling back on the dial indicator stop bar and if the dial moves back to the "0" position you will have to move the reel towards you. If that cannot be done the reel will have to be moved away from you.

There are two adjusting steps for final positioning of the reel as follows:

1. With the reel set gage still in the left hand side of reel, turn the horizontal adjusting screw (Fig. 21) in the direction required to match the initial indicator reading on the right hand reel position side. (See Fig. 19A, 19B, 19C)

Example: See paragraph F, Step 1 dial indicator reading.
Large Dial -0 Small Dial - 5

2. Now travel farther by the amount shown in paragraph F, Step 4 to put the reel in reel position 3 (HOME). (See Fig. 20)

Example: D = .108 See Fig. 19C for indicator reading at final position No. 3 (HOME) shown at Fig. 20. This indicator is to move a total of .108 thousands, .100 thousands on the small dial, then .008 thousands on the large dial.
(Reference: $.500 - .108 = .392$)

H. Now move the set up stand back to the right side of the reel. Set indicator rod on the same spot you used the first time and re-set large dial on "0". Make sure you read the setting on the small scale and note. Then proceed with paragraph "G". This should give final adjustment. When you have done this procedure a few times you will find this procedure will become very easy.

VERTICAL ADJUSTING SCREW

LOCKING PLATE

HORIZONTAL LOCKING HANDLE

HORIZONTAL ADJUSTING SCREW

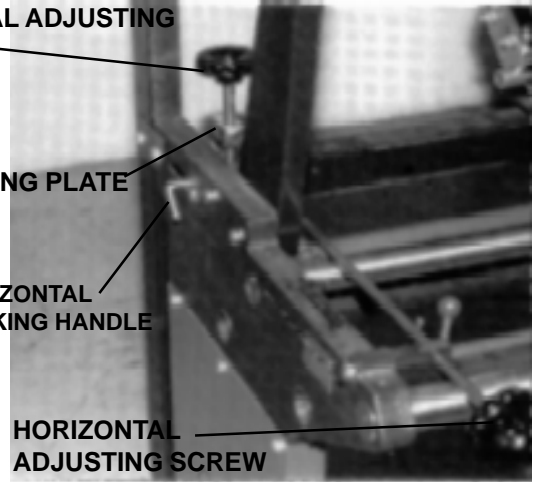


Fig. 21



It is essential that care is taken when setting the reel up in the horizontal positions in order to grind it into a cylinder shape. Any misalignment will cause you to grind into a cone.

I. When the horizontal parallelism has been adjusted to within .003" end to end tighten the horizontal adjustment locking handle (See Fig. 21), and both overhead clamp adjusting knobs. (See Fig. 22) When tightening the knob it is very important that you have the dial indicator located at the side of the reel and watch it as you tighten. It must not move in the tightening process. After both knobs are tight, recheck alignment.



Knobs can be additionally tightened with an allen wrench to insure maximum locking power.

STEPS SUMMARY-

STEP 1 - Measure right side. Record dial indicator reading.

STEP 2 - Measure left side. Record dial indicator reading.

STEP 3 - Calculate difference between right and left dial indicator values.

STEP 4 - Calculate overtravel distance. Total movement will be amount from Step 3 "C" **PLUS** the overtravel distance "D". Movement brings you to this total HOME position #3 and on recheck dial should indicate 0-0 left to right.

OPERATING INSTRUCTIONS

CHECKING REEL FOR CONE SHAPE BEFORE GRINDING, REEL ROUNDNESS, STRAIGHTNESS OF REEL OUTSIDE DIAMETER.

A. Before storing the set-up gage, it is very effective to use it to check the unground reel to determine the amount the reel is conical in shape or which end has the larger diameter. (See Fig. 22) Start with the set-up gage at the right end of the reel. Loosen the wing nut on the indicator stop bar, holding the indicator rod firmly against one blade (see Fig. 24). Pull the indicator stop bar back until it clears the plunger, then advance it forward until it contacts the plunger and advances it 1/2 inch further. Lock in place. This sets the plunger at its midpoint and allows adequate movement in both directions. Set outer dial at zero and note position of pointer on small dial.

B. Now move the set up gage to the left side of reel and dial indicate the same blade. From the reading, determine the amount the reel is cone shaped. This also determines the high point for grinding. Grinding of a reel should always start at the high point.

C. After grinding a reel, check the roundness on each end of the reel and center before removing the ground reel. (See Fig. 24)

D. **Straightness of reel outside diameter.** Take indicator readings at both ends of reel. Compare readings between each end of reel for straightness. All readings to be within .002".

E. When completed, carefully remove dial set up gage and store in safe clean location.

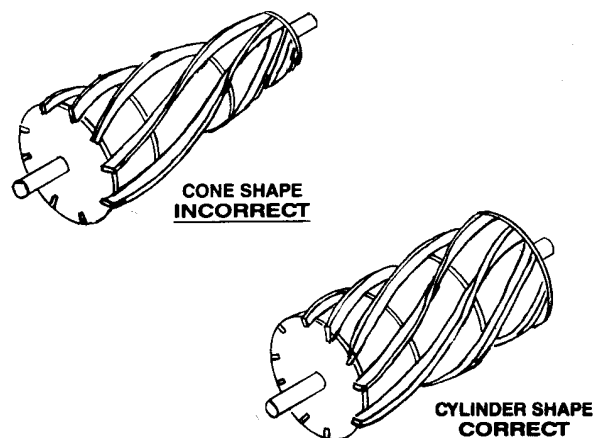


Fig. 22

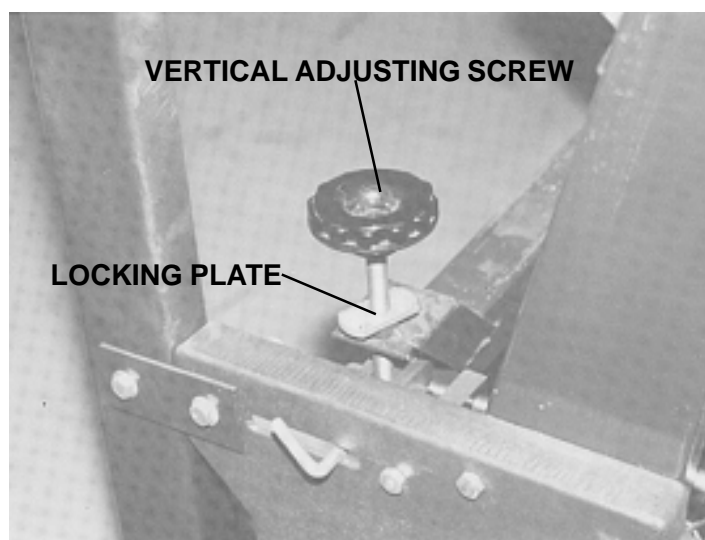


Fig. 23

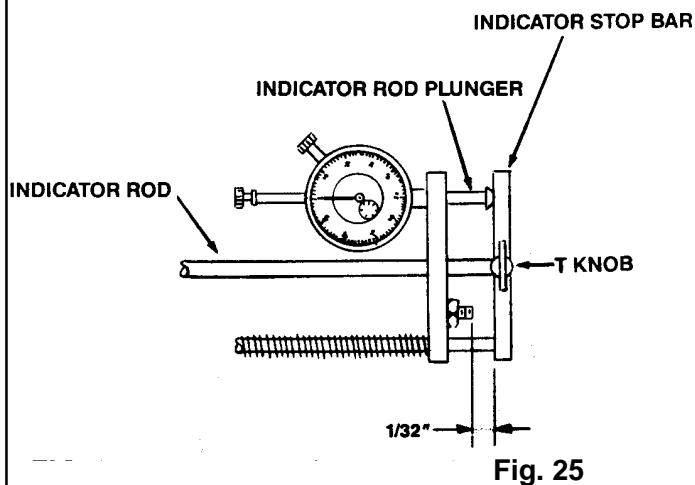


Fig. 25

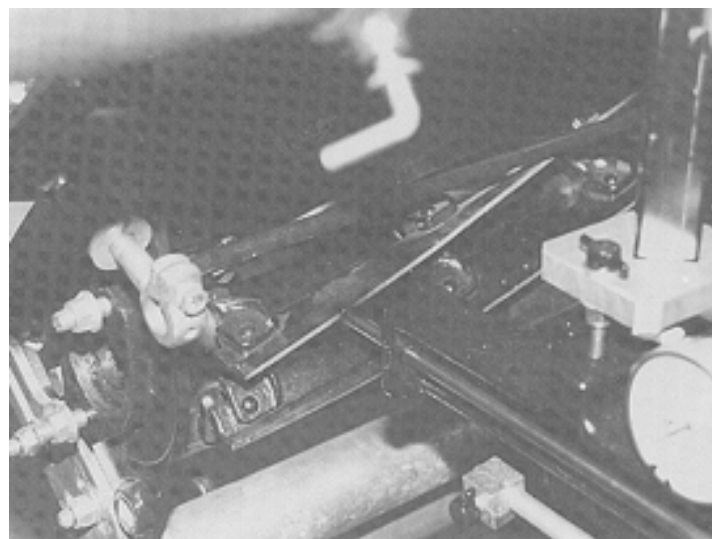
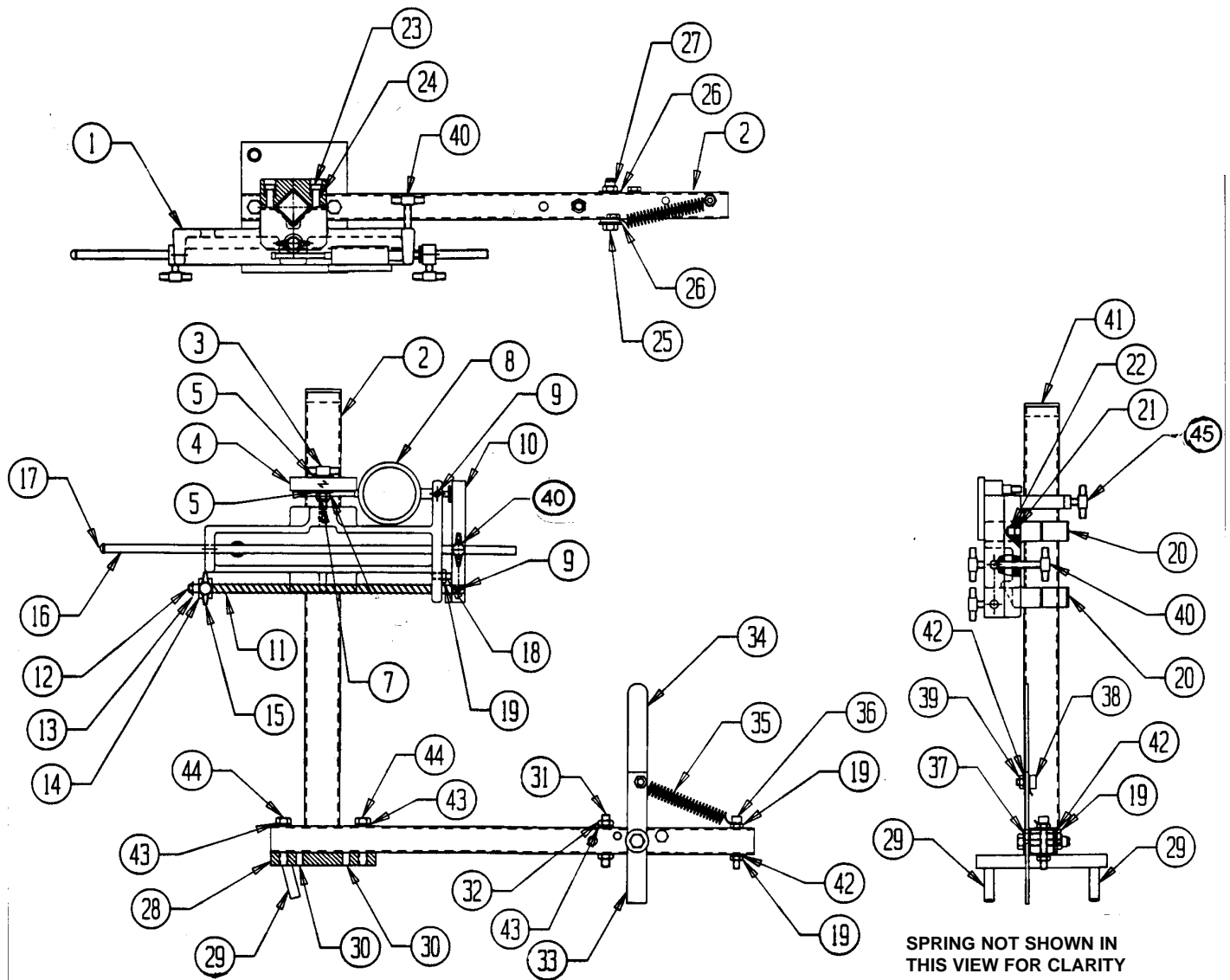


Fig. 24

EXPLODED VIEW: 3889560 REEL ALIGNMENT GAGE



PARTS LIST FOR THE 3889560 REEL ALIGNEMENT GAGE

DIA. NO.	PART NO.	DESCRIPTION	DIA. NO.	PART NO.	DESCRIPTION
1	6009089	Slide, Setup Gage	23	3708453	Shoulder Bolt, 1/4 x 3/4
2	3889559	Gage Slide Weldment	24	3708175	Comp. Spring
3	6009599	Tee Knob Assembly	25	B312801	5/16-18 x 1-1/4 Hex Head Cap Screw
4	6009049	Block, Adjust Slide	26	K310001	5/16 Flat Washer
5	K250001	1/4 Flat Washer	27	J317100	Locknut, Nylon 5/16-18 Full
7	J257100	Locknut, Nylon 1/4-20 Full	28	3969114	Gage Base Locator
8	3579123	Dial Indicator	29	H372802	Rollpin 3/8 x 1-3/4
9	C250420	1/4-20 x 1/4 Socket Set Screw	30	H250802	Rollpin 1/4 x 1/2
10	6009054	Bar, Indicator Stop	31	C313220	5/16-18 x 2 Socket Set Scw
11	3709278	Spring, Compression	32	J312000	5/16-18 Hex Jam Nut
12	3969109	Spring, Guide Rod	33	3969112	Gage Handle
13	3709336	Push on Ring	34	3709624	Handle
14	3109022	Stop Block	35	3709821	Extension Spring
15	6009598	Tee Knob Assembly	36	C253220	1/4-20 x 2 Socket Set Screw
16	6009055	Rod, Gage	37	B252001	1/4-20 x 1-3/4 Hex Head Cap Screw
17	3708540	3/8 Domed Anvil	38	B250831	1/4-28 x 1/2 Socket Head Cap Screw
18	C251220	1/4-20 x 3/4 Socket Set Screw	39	J251001	Hex Nut 1/4-28
19	J252000	1/4-20 Hex Jam Nut	40	6009596	Tee Knob Assembly
20	6009050	Clamp, Spring Loaded	41	3708154	Plug
21	C310420	5/16-18 x 1/4 Socket Set Screw	42	K251501	1/4 Split Lockwasher
22	3579109	Nylon Plug	43	K311501	5/16 Split Lockwasher
			44	B312401	5/16-18 x 1-1/2 Hex Head Cap Screw
			45	7469533	Tee Knob Assembly