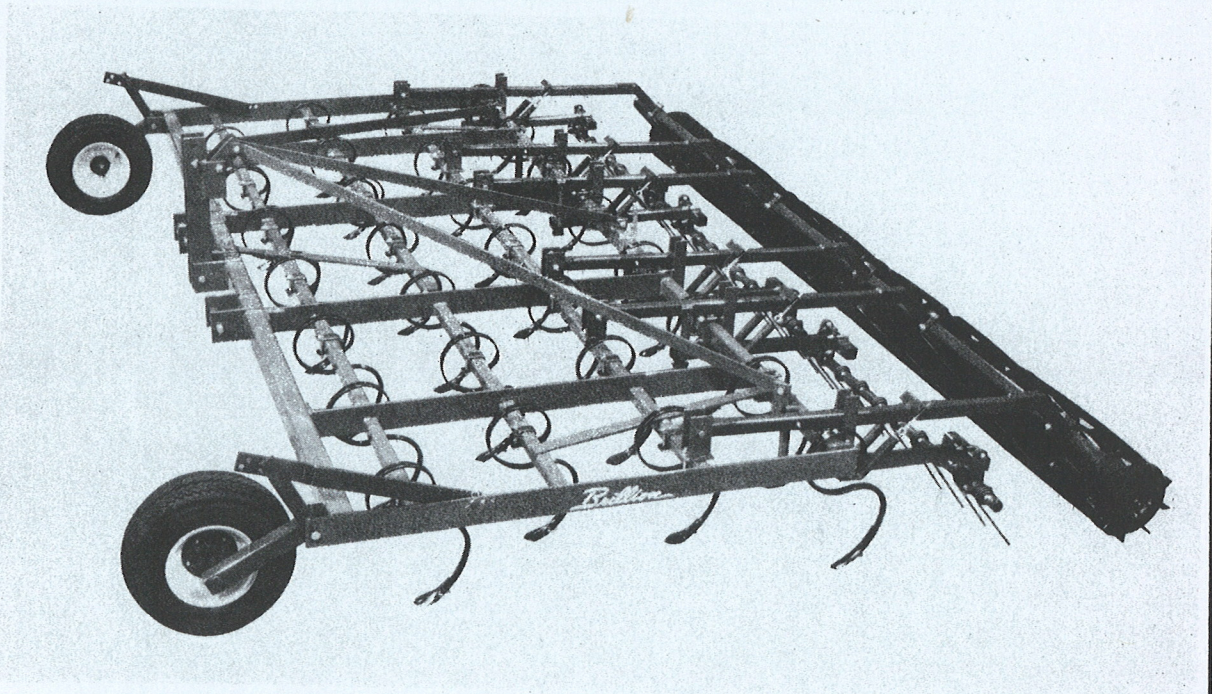


OPERATOR'S MANUAL
ASSEMBLY INSTRUCTIONS



REAR MOUNTED FIELD CULTIVATOR

MODELS: CM-12, CM-15, & CM-18



1292



BRILLION IRON WORKS, INC.
BRILLION, WISCONSIN 54110

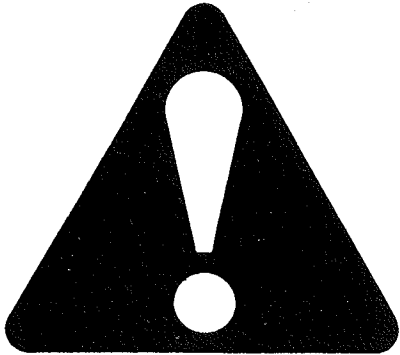
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INTRODUCTION

To obtain maximum benefits from the BRILLION CULTIVATOR, please study this manual carefully before starting assembly or operation. A special section, "Assembly Instructions", is included.



This symbol shown is used to call your attention to instructions concerning your personal safety. This symbol is found on your machine - it points out important safety precautions. It means "ATTENTION! - Become Alert! Your Personal Safety Is Involved!" Read the message that follows and be alert to the possibility of personal injury or death.

BE ALERT!
Your Safety Is Involved.

Location Reference

Right hand, left hand and forward designations are determined by standing behind the machine and facing the direction it will travel during field operation.

Parts Ordering

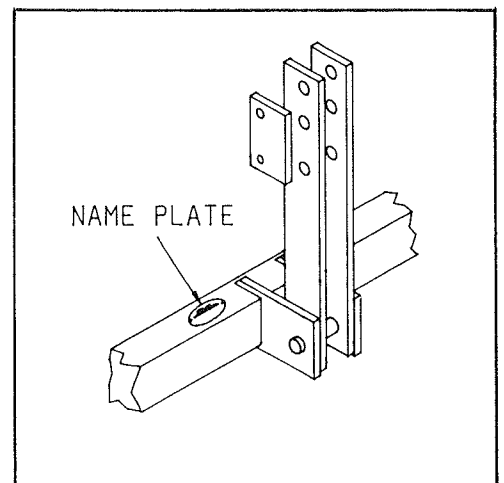
When ordering parts for this machine, include the complete model number and serial number. Refer to the name plate on the front frame tube as shown below. Please read and record this number upon taking delivery of this machine.

Cultivator Model _____

Serial Number _____

Date Purchased _____

Be sure to read the warranty card which is shipped with the machine. Return the proper portion of the card for recording at the factory.





SAFETY SUGGESTIONS

Investigation has shown that nearly one third of all farm accidents are caused by careless use of machinery. You can do your part in improving safety by observing the following suggestions. Insist that all people working with you or for you abide by them.

1. Do not stand between the tractor and implement when attaching or detaching implement unless both are not moving.
2. Do not make adjustments or lubricate machine while it is in motion.
3. Do not allow anyone to ride on tractor or machine.
4. Be sure front end of tractor is heavy enough so that operator can maintain steering control when cultivator is carried.
5. Do not transport at speeds over 15 m.p.h.
6. Avoid sudden stops or turns when transporting because weight of machine may cause operator to lose control of tractor.
7. When transporting the machine on a road or highway, use adequate warning symbols, reflectors, lights, and slow moving vehicle signs as required.
8. Lower machine to ground when not in use.
9. Securely block machine when working on or under it to prevent injury in case of hydraulic failure or inadvertent lowering by another person.

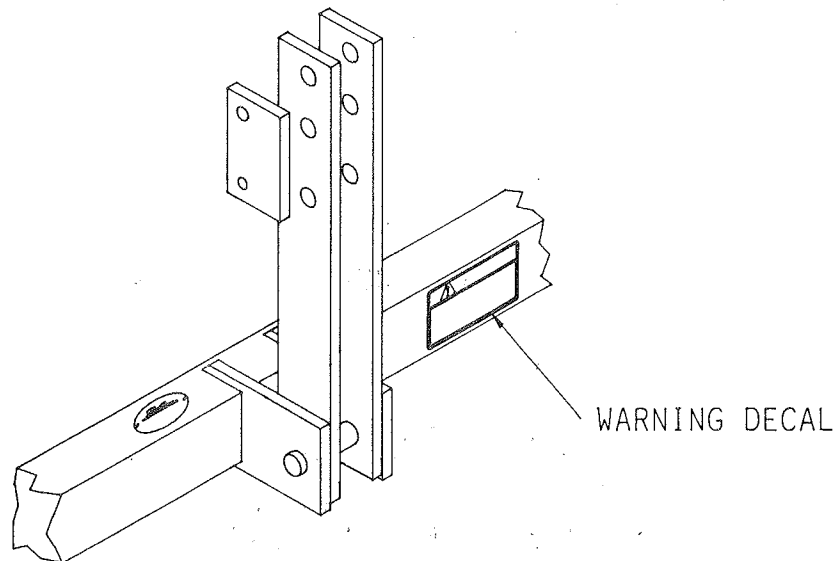
SAFETY WARNING SIGNS

The "WARNING" sign illustrated on this page is placed on the machine to warn of hazards. The warnings found on the sign are for your personal safety and those around you. **OBSERVE THESE WARNINGS!**

Keep these signs clean so they can be observed readily. Wash with soap and water or cleaning solution as required.

Replace "WARNING" signs should they become damaged, painted over or if they are missing.

When replacing decals, clean the machine surface thoroughly using soap and water or cleaning solution to remove all dirt and grease.



⚠ CAUTION

1. DO NOT LUBRICATE, ADJUST OR REPAIR WHEN MACHINE IS IN MOTION.
2. DO NOT TOW OR TRANSPORT FASTER THAN 15 MILES PER HOUR.
3. DO NOT RIDE OR ALLOW OTHERS TO RIDE ON THE MACHINE.
4. BLOCK UP ALL HYDRAULICALLY OR MECHANICALLY RAISED COMPONENTS TO PREVENT UNINTENDED LOWERING OR LOWER THE MACHINE TO THE GROUND TO MAKE ADJUSTMENTS OR REPAIRS OR WHEN NOT IN USE.
5. KEEP ALL PERSONS AWAY FROM MACHINE DURING HITCHING AND OPERATING.
6. SLOW DOWN BEFORE MAKING SHARP TURNS OR USING THE BRAKES. DRIVE SLOWLY OVER ROUGH GROUND, SIDE HILLS, AND AROUND CURVES TO AVOID TIPPING.
7. COMPLY WITH ALL LAWS WHEN TRANSPORTING THE MACHINE ON PUBLIC ROADWAYS.
8. INSTRUCT ALL OPERATORS IN THE SAFE OPERATION OF THE MACHINE. REVIEW THE OPERATOR'S MANUAL FOR CORRECT PROCEDURES.

8J310

Repair Part No. 8J310
Color - Black & Yellow

OPERATING INSTRUCTIONS

Attaching Tractors with Category II Hitch

See Figure 1. Install lower hitch pins with cast iron spacers toward outside of tractor lift arms. Secure with klik pins. The 1-7/16" O.D. sleeves are for quick coupler only.

On the center mast (for three-point free link hitch) use the middle hole and install the 1" clevis pin and klik pin. The 1-1/4" O.D. sleeve is not used. See Figure 1.

On the center mast (for quick coupler) use the bottom hole and install the 1" clevis pin, 1-1/4" O.D. sleeve, and klik pin. See Figure 1.



Be sure all hitch points seat properly. Watch for possible interference between cultivator, tractor, and linkages when raising the first time.

FIGURE 1

CATEGORY II & CATEGORY II QUICK COUPLER HITCHES

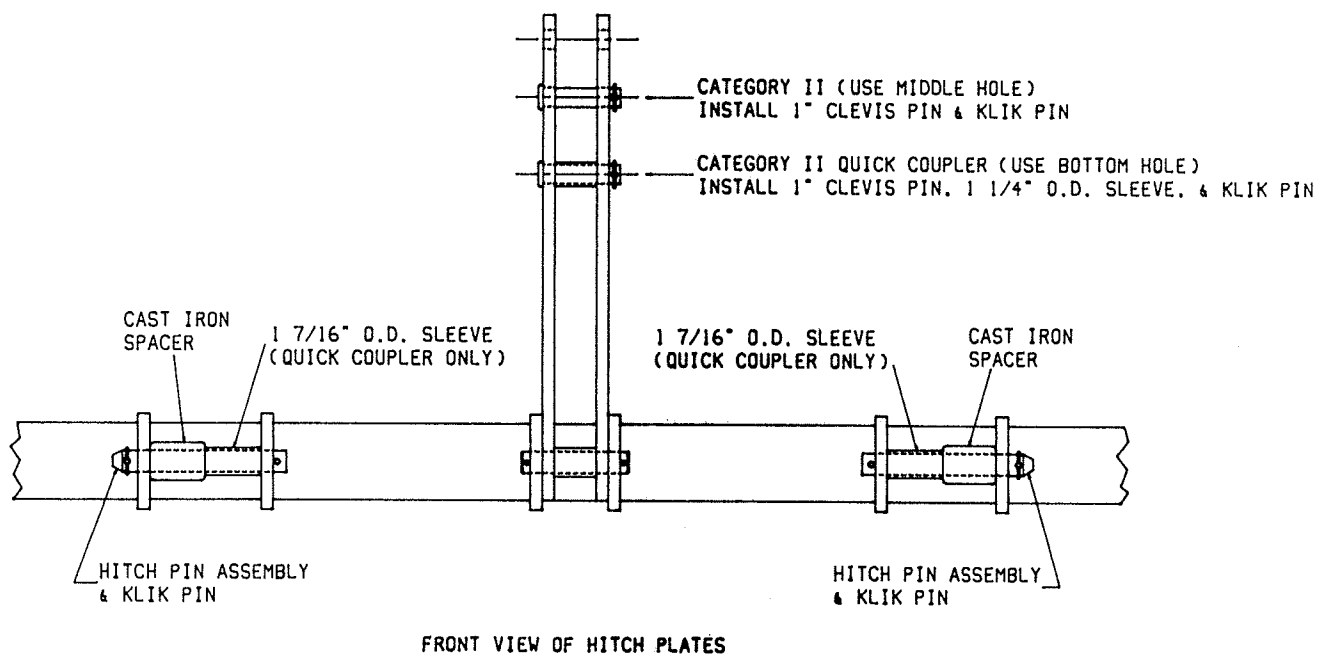
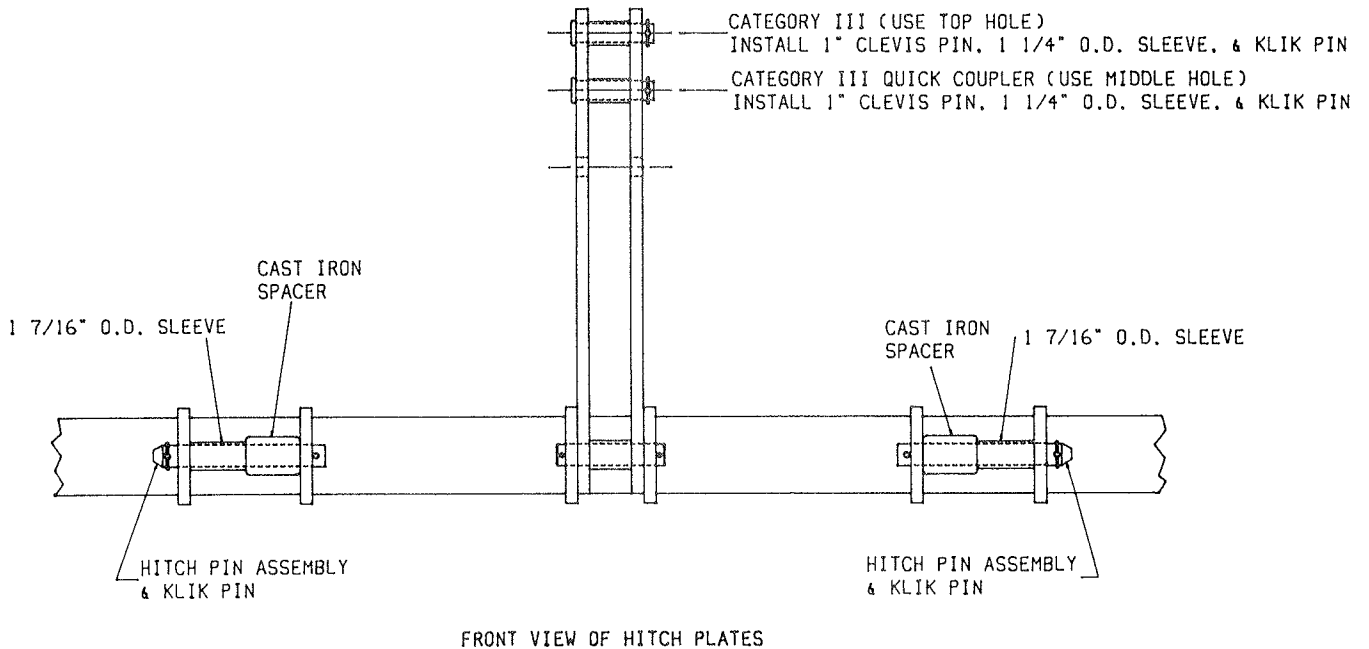


FIGURE 2

CATEGORY III & CATEGORY III QUICK COUPLER HITCHES




Attaching Tractors with Category III Hitch

See Figure 2. Install lower hitch pins with cast iron spacers toward inside of tractor lift arms and with 1-7/16" O.D. sleeves as shown. Secure with klik pins.

On the center mast (for three-point free link hitch) use the top hole and install the 1" clevis pin, 1-1/4" O.D. sleeve, and klik pin. See Figure 2.

On the center mast (for quick coupler) use the middle hole and install the 1" clevis pin, 1-1/4" O.D. sleeve, and klik pin. See Figure 2.

 Be sure all hitch points seat properly. Watch for possible interference between cultivator, tractor, and linkages when raising the first time.

Field Operation and Adjustments

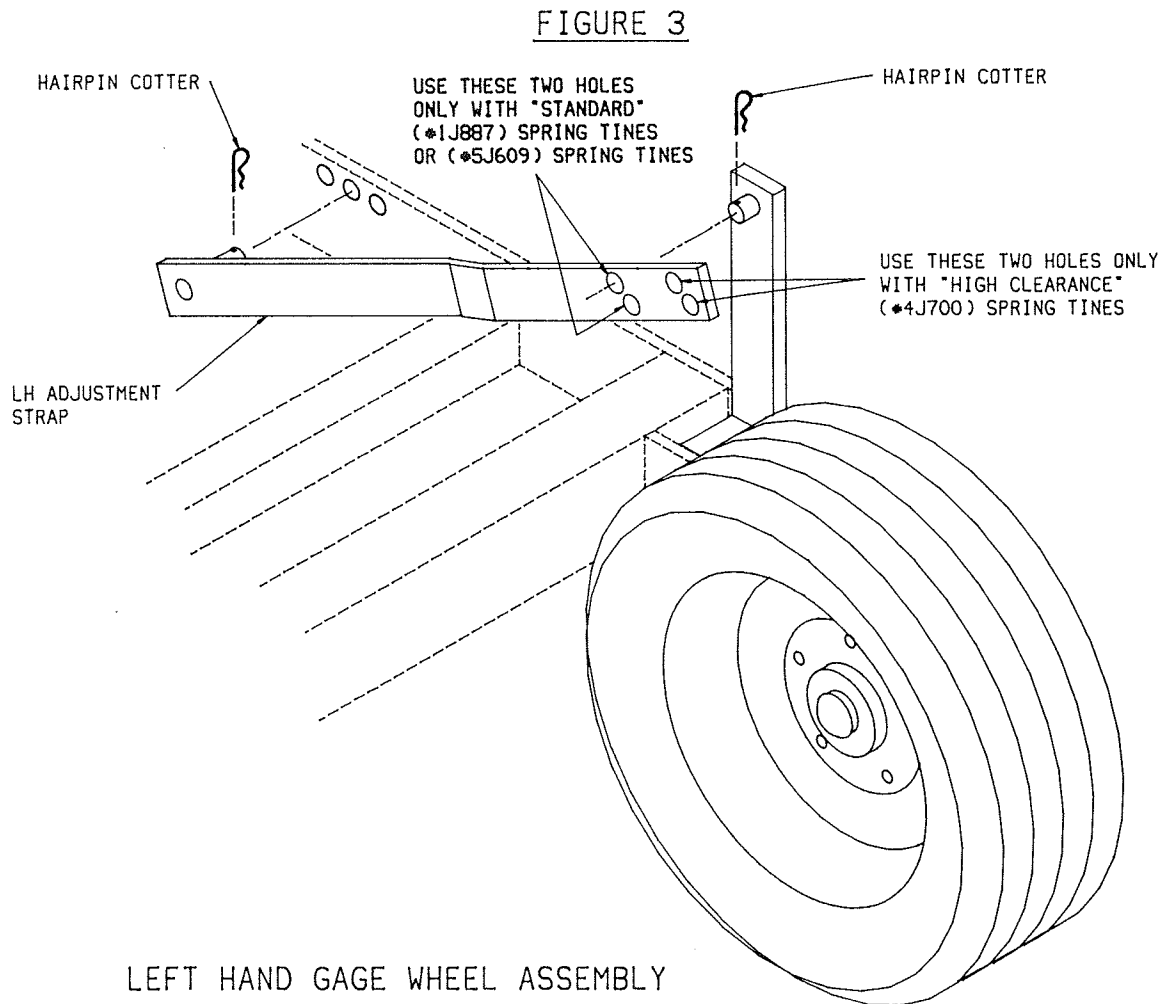
This type of cultivator is designed primarily for mechanical weed control, incorporation of fertilizers and herbicides, and as a leveling tool in the preparation of a uniform seed bed. It is a finishing tool and should be used accordingly.

After you have mounted the cultivator to the tractor, check assembly of unit to be sure that the harrow reel support beams and the coil tine supports are free to pivot in their mounting brackets. Harrow reels and coil tine levelers must have freedom to float during field operation, without interferences.

Next, level the machine in both directions: side-to-side and front-to-rear. This is especially important for chemical incorporation. For side-to-side leveling, raise unit a few inches off ground and "eye ball" the cultivator frame with the tractor axle. Adjust tractor lower links until machine frame and tractor axle are parallel.

For front-to-rear leveling in field, lower cultivator to working depth and drive forward a short distance. Stop tractor and check if cultivator is level with soil. Adjust top (center) link of tractor to level cultivator front-to-rear.

Setting the working depth is best accomplished by using gage wheels (optional) mounted onto the front corners of the machine. The gage wheels allow for six different working depth positions with the maximum being approximately 5". Each subsequent position reduces working depth about 3/4". See gage wheel adjustment strap in Figure 3. Set both gage wheels the same depth. Note that the outer set of holes in the adjustment strap should be used only on machines with high clearance (#4J700) spring tines. The inner set of holes in this strap is exclusively for machines with standard (#1J887) spring tines. Set the machine to run no deeper than required for your specific application, generally 2" to 4" deep.



The pivot weldment is attached to the mast and to the braces. Its attaching hardware (3/4" bolt and lock nut) should be assembled with just enough looseness to allow freedom to pivot. The same is true for the hardware attaching the braces. This affords the entire machine some flexibility during field operations or when transporting through gullies or ditches (provided no bolt or pin is assembled into lower pivot weldment hole). Normally this is how machine should be operated. Where field conditions are always flat the unit could be pinned rigid if desired. See Figure 4.

The "down pressure" on the harrow reels can be adjusted by tightening or loosening the lock nuts on eye bolts to increase or decrease spring tension. A good initial setting is with 1-1/4" of threaded eye bolt extending beyond the lock nuts. See Figure 4. Keep in mind that numerous field conditions can affect the action of the harrow reels; type of soil, soil moisture, amount of debris, to mention a few.

The working angle of the coil tine leveler can be adjusted by loosening the clamps that hold the coil tine mounting pipe. Change the pitch of the tines as desired and re-tighten clamps. A good initial setting is with coil tines pitched about 30° to the rear. See Figure 4.

Special Instructions

1. Attach front end weights to tractor, if necessary, to insure proper steering control and stability. Refer to your tractor operators manual.
2. Raise cultivator out of ground before turning. This prevents undue stress on hitch lugs, spring tines, harrow reel supports, etc..
3. Operate at speeds of 5 - 8 mph for best results.
4. Never back up while machine is in the ground.
5. Heed all safety instructions previously discussed in this manual.

MAINTENANCE

Fasteners

After the first few hours' use check tightness of fasteners on entire machine. Periodic checks should be made thereafter. At the end of each season remove and check the 3/4" bolt that fastens the pivot weldment to the mast and the 5/8" bolts that attach both ends of the braces. These are critical hardware items that are subject to wear and should be replaced as necessary.

Tires

Recommended inflation pressure on optional gage wheels is 35 p.s.i.. Check periodically and maintain this tire pressure.

Lubrication

Gage wheel bearings should be repacked annually. Harrow reel bearings are sealed and pre-lubricated and are not regreasable.

Points or Shovels

The life of shovels, points, and attaching hardware varies considerably with the type of soil you are working. Replace these items as necessary.

"CROSS SECTION" VIEW OF MACHINE EQUIPPED WITH STANDARD TINES

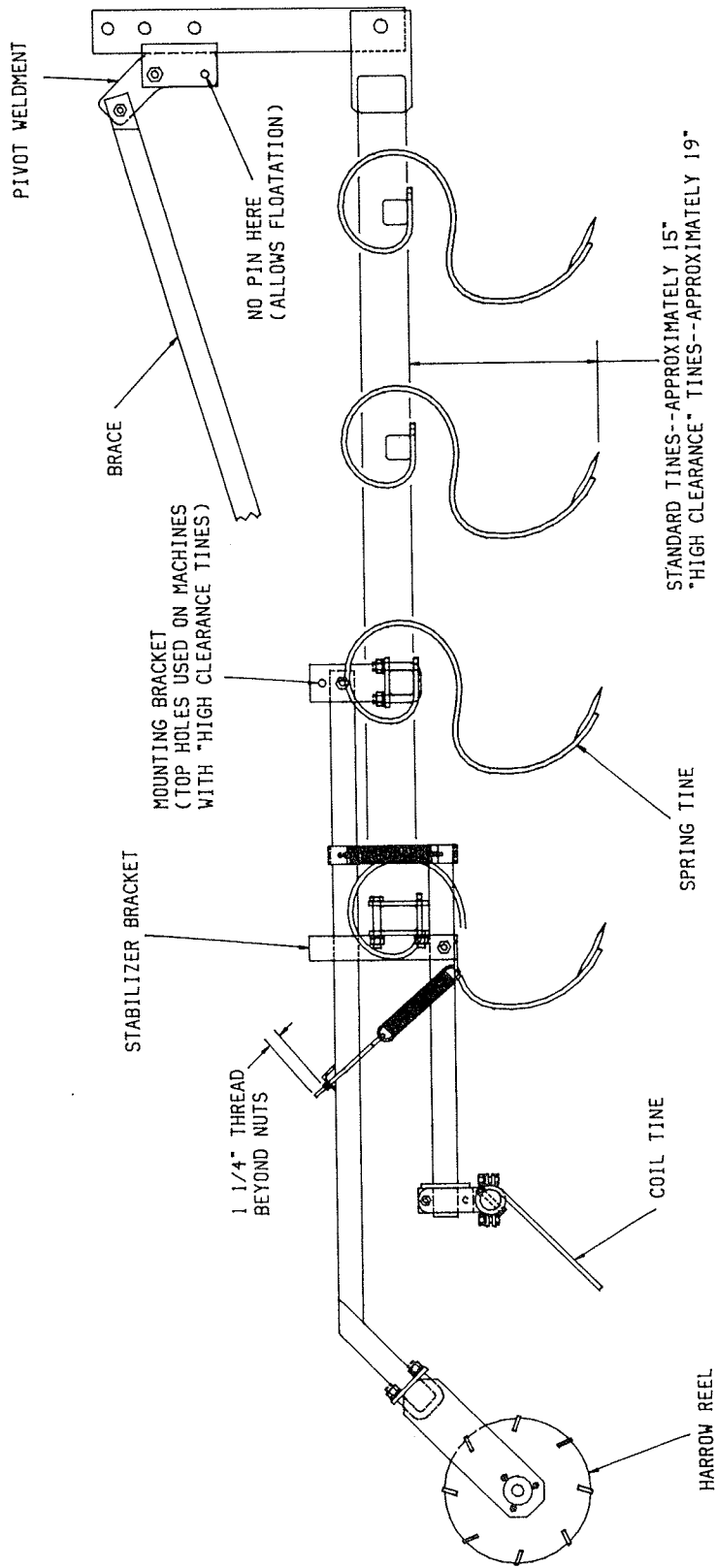


FIGURE 4

SHIPPING BUNDLES (QUANTITIES)

<u>Part #</u>	<u>Description</u>	<u>CM-12</u>	<u>CM-15</u>	<u>CM-18</u>
2K413	Frame - 12'	1	0	0
2K403	Frame - 15'	0	1	0
2K392	Frame - 18'	0	0	1
2K414	LH strap weldment	1	1	1
2K415	RH strap weldment	1	1	1
2K419	Brace bundle	1	0	0
2K418	Brace bundle	0	1	1
2K659	Pipe and tine assembly - 6'	2	0	3
2K660	Pipe and tine assembly - 5'	0	3	0
2K640	Tube weldment	4	6	6
2K609	LH support beam	2	3	3
2K610	RH support beam	2	3	3
2K633	Harrow reel assembly - 6'	2	0	3
2K632	Harrow reel assembly - 5'	0	3	0
1J887	Spring tine	23	29	35
2K661	Drag box assembly	0	1	1
2K662	Drag box assembly	1	0	0
2K668	Support box assembly	1	0	0
2K663	Support box assembly	0	1	1
2K664	Hardware box assembly	1	1	1
2K667	Clamp box assembly	1	0	0
2K666	Clamp box assembly	0	1	0
2K665	Clamp box assembly	0	0	1
2K705	Points box assembly	1	0	0
2K706	Points box assembly	0	1	0
2K707	Points box assembly	0	0	1

ASSEMBLY INSTRUCTIONS

Frame, Mast, and Braces

Using blocks or other supports, block up frame 20" to 24" from bottom of frame to floor. Make certain that it is secure and cannot topple.

Keep your Repair Parts Manual nearby as it's illustrations can be helpful in showing the relative position of parts.

Assemble the left hand and right hand strap weldments (mast) to the center set of lugs on the frame. See Figure 5. Attach these straps with a 1-1/8" dia. x 5-5/8" long pin and with a 1-1/2" O.D. x 2-1/8" long spacer between them to space them apart. Lock pin in place with 1/4 x 2" roll pins. Then assemble the pivot weldment (with tubular cross member downward) to the strap weldments with a 3/4" x 5-1/2" long bolt and lock nut. Do not snug up tight; allow just enough looseness for pivot weldment to rock back and forth.

Next, attach the braces from the pivot weldment to the lugs on the rearmost frame tube. On the 12' machine two braces are used. Attach them to the rear of the frame with 5/8" x 1-3/4" grade 5 bolts and lock nuts and to the pivot weldment with a 5/8" x 5-1/2" grade 5 bolt and lock nut. See Figure 6. Allow just a slight looseness on these 5/8" lock nuts. On 15' and 18' machines a third brace (center brace) is required. Attach it to the angle on the center of the rearmost frame tube and to the inside of the pivot weldment. Use a 1" O.D. x 3/4" long spacer on each side of center brace where it attaches to pivot weldment. Again, allow a slight looseness on 5/8" bolt and lock nut that attach center brace to frame.

Spring Tines

To assemble the spring tines to the frame tubes, first locate the clamp box assembly which includes all clamps and fasteners necessary. The standard tine spacing is 6", however an optional 4" spacing is available. Examine Figures 7 through 12 and determine which drawing describes your machine size and tine spacing.

The frame tubes are marked for location of spring tines for the standard 6" tooth spacing. Otherwise mark the center line of the frame on all frame tubes. Then mark the tine locations on these tubes as dimensioned on the drawing that describes your machine (Figures 7 through 12).

Assemble tines onto all of the 2" x 2" frame tubes with the formed clamps and carriage bolts provided. Then proceed with assembly of tines onto the rear 2" x 3" frame tube. Note that for the rear frame tube a different type of clamping arrangement consisting of flat 1/4 x 3 x 3-1/2" plates may be provided. See Figure 13 which shows the position of plates and attaching hardware.

Harrow Reels and Supporting Brackets

Again, refer to the proper drawing which describes your machine (Figures 7 through 12). The centerline of the right hand and left hand support beams are dimensioned on this drawing. Pencil mark these centerline locations on the rearmost frame tube and on the next tube in from the rearmost tube. These pencil marks will represent the centerlines of the #2K644 mounting brackets and the #2K645 stabilizer brackets which can now be assembled to the frame.

Attach the stabilizer brackets to the rear 2" x 3" tube with #2K648 plates, 5/8 x 3-3/4" bolts, lock washers, and nuts. Be sure brackets are perpendicular to frame. See Figure 14. Attach the mounting brackets to the 2" x 2" tube with 5/8" u-bolts, lock washers, and nuts. Tighten all hardware securely.

FIG. 5

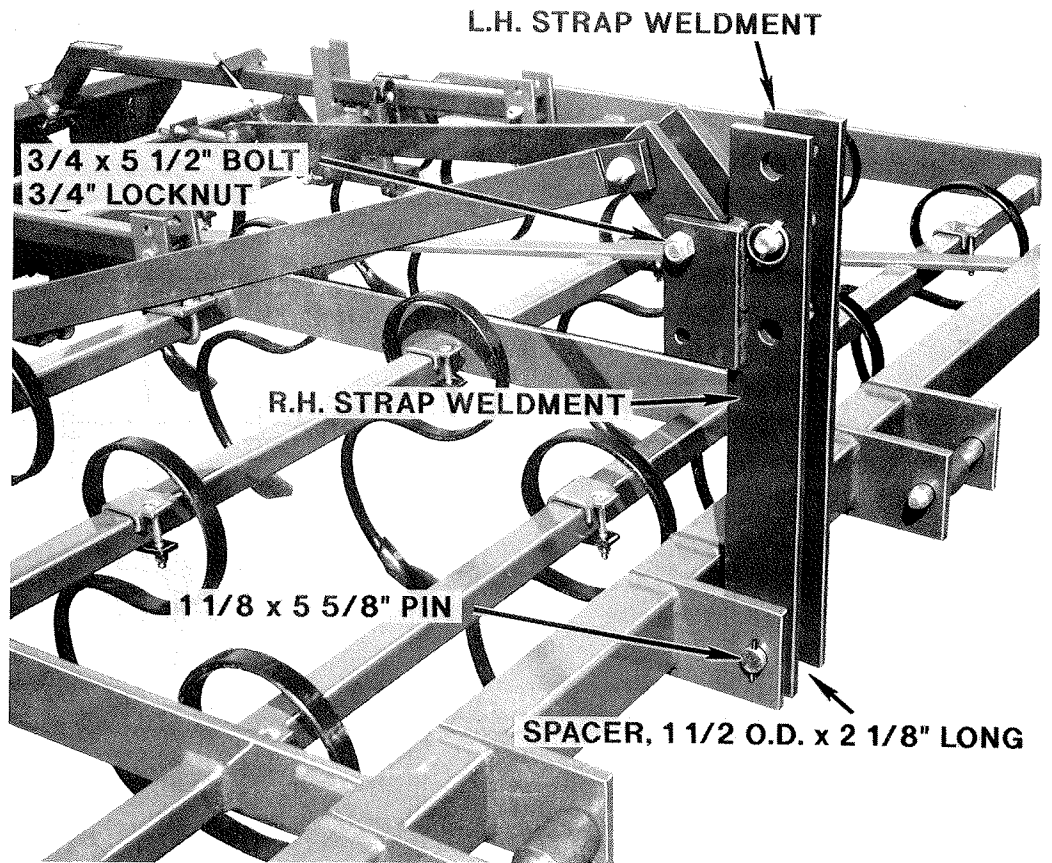
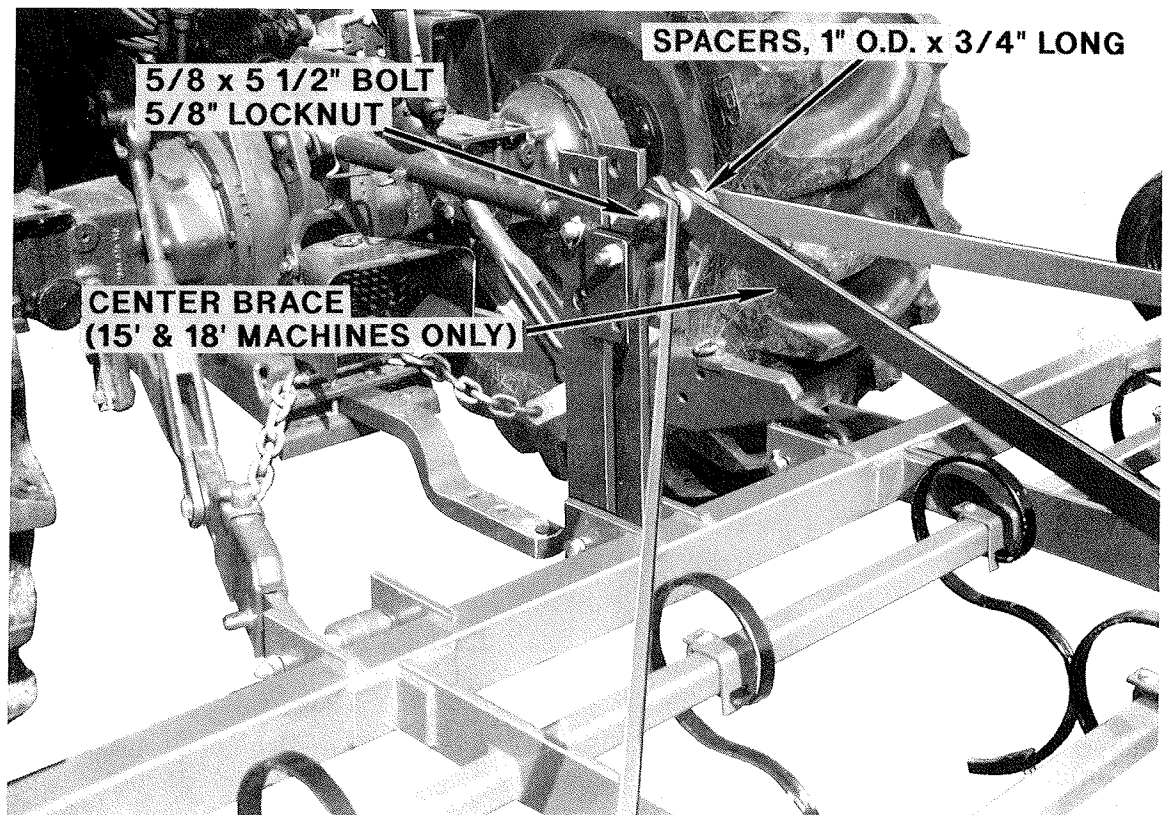


FIG. 6



12' MACHINE WITH 6" SPRING TOOTH SPACING

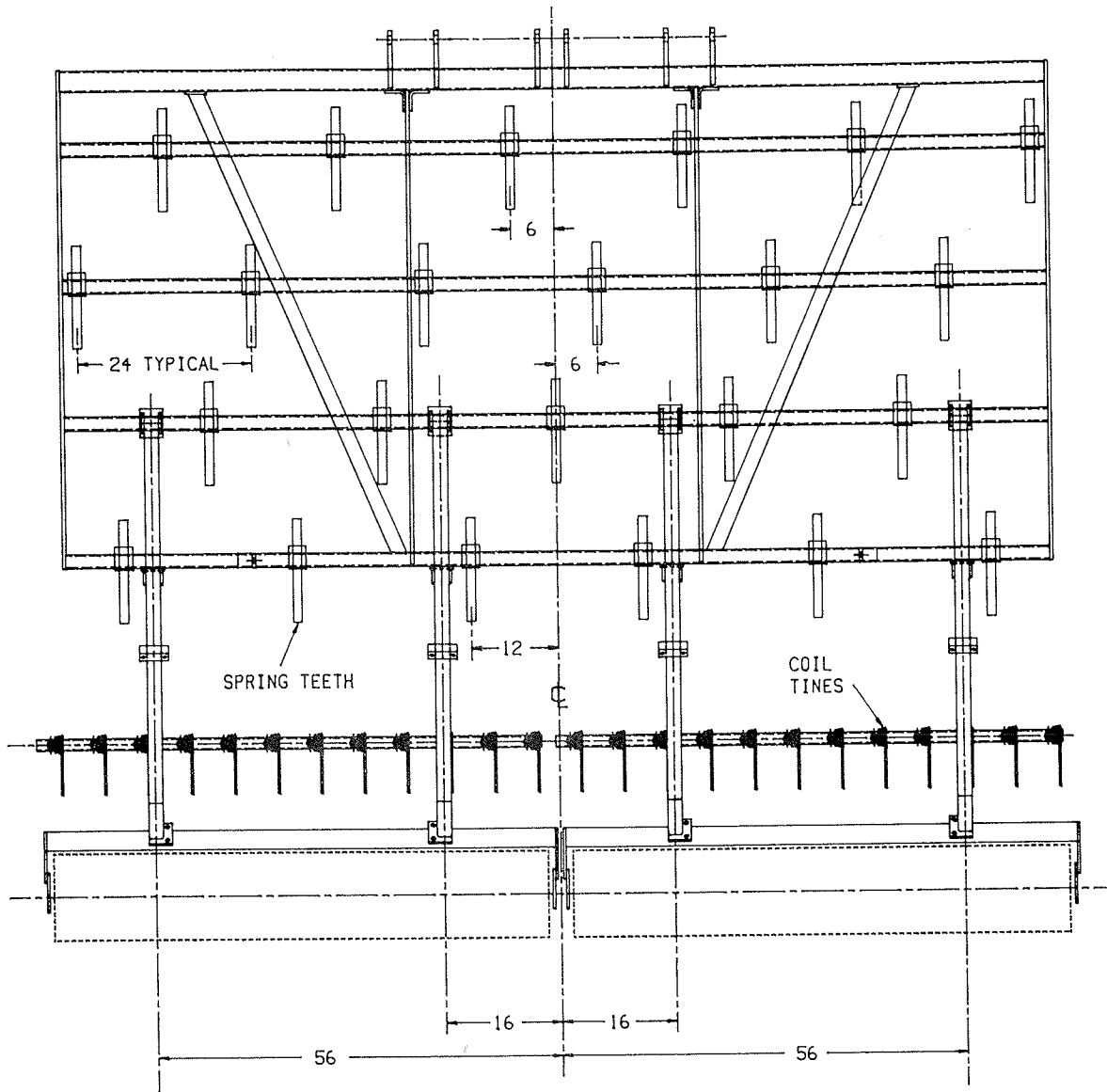


FIGURE 7

12' MACHINE WITH 4" SPRING TOOTH SPACING

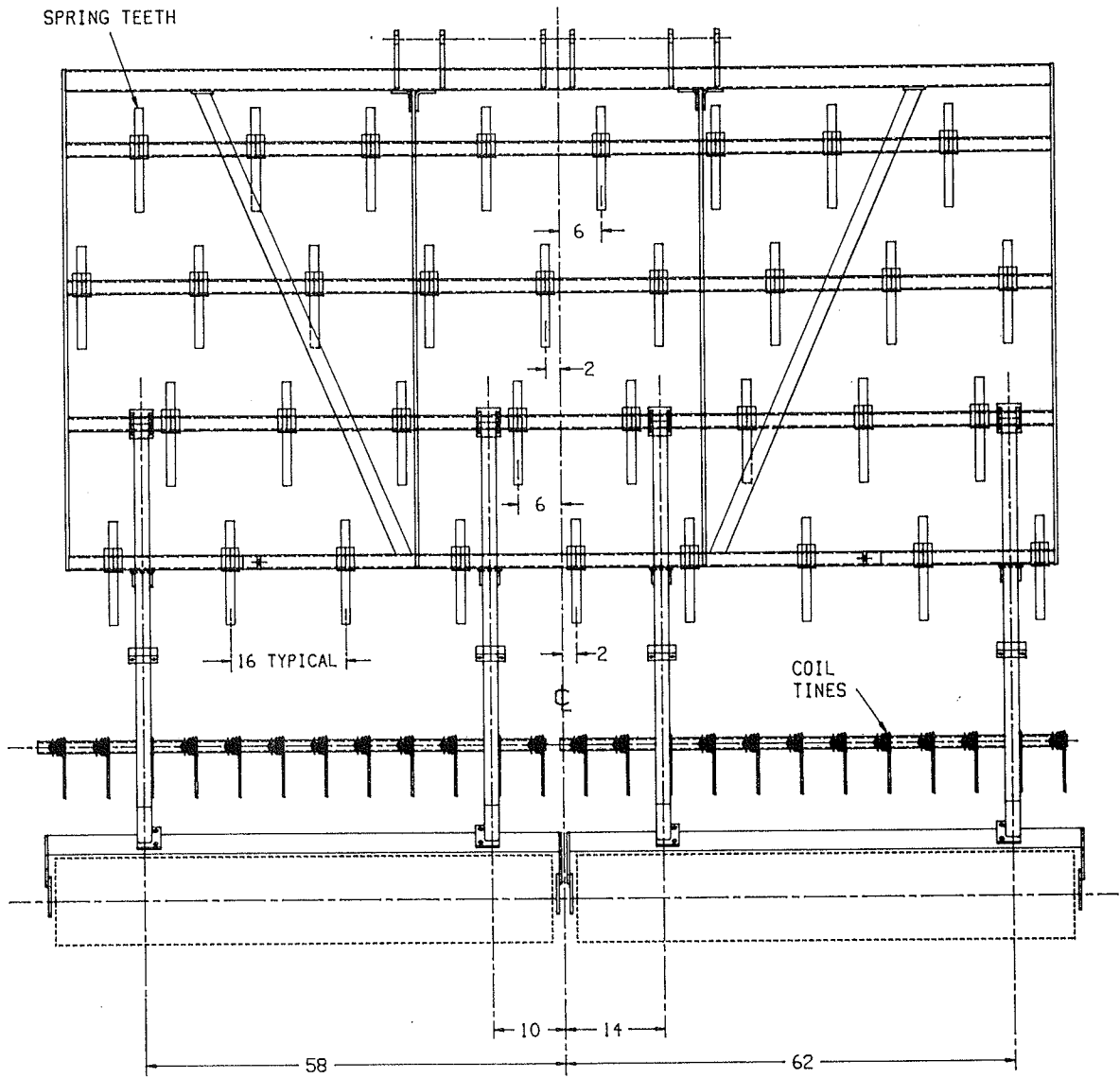


FIGURE 8

15' MACHINE WITH 6" SPRING TOOTH SPACING

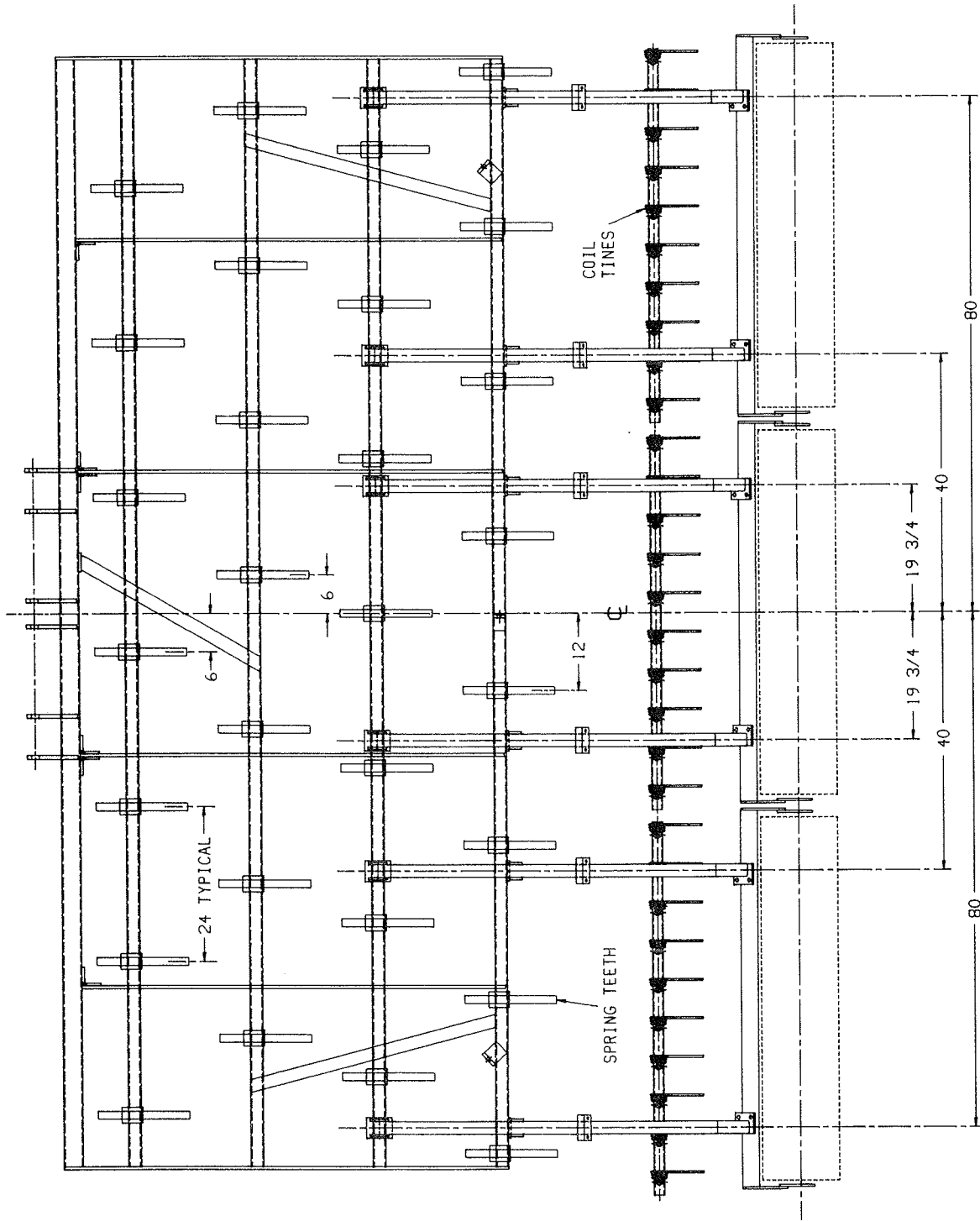


FIGURE 9

15' MACHINE WITH 4" SPRING TOOTH SPACING

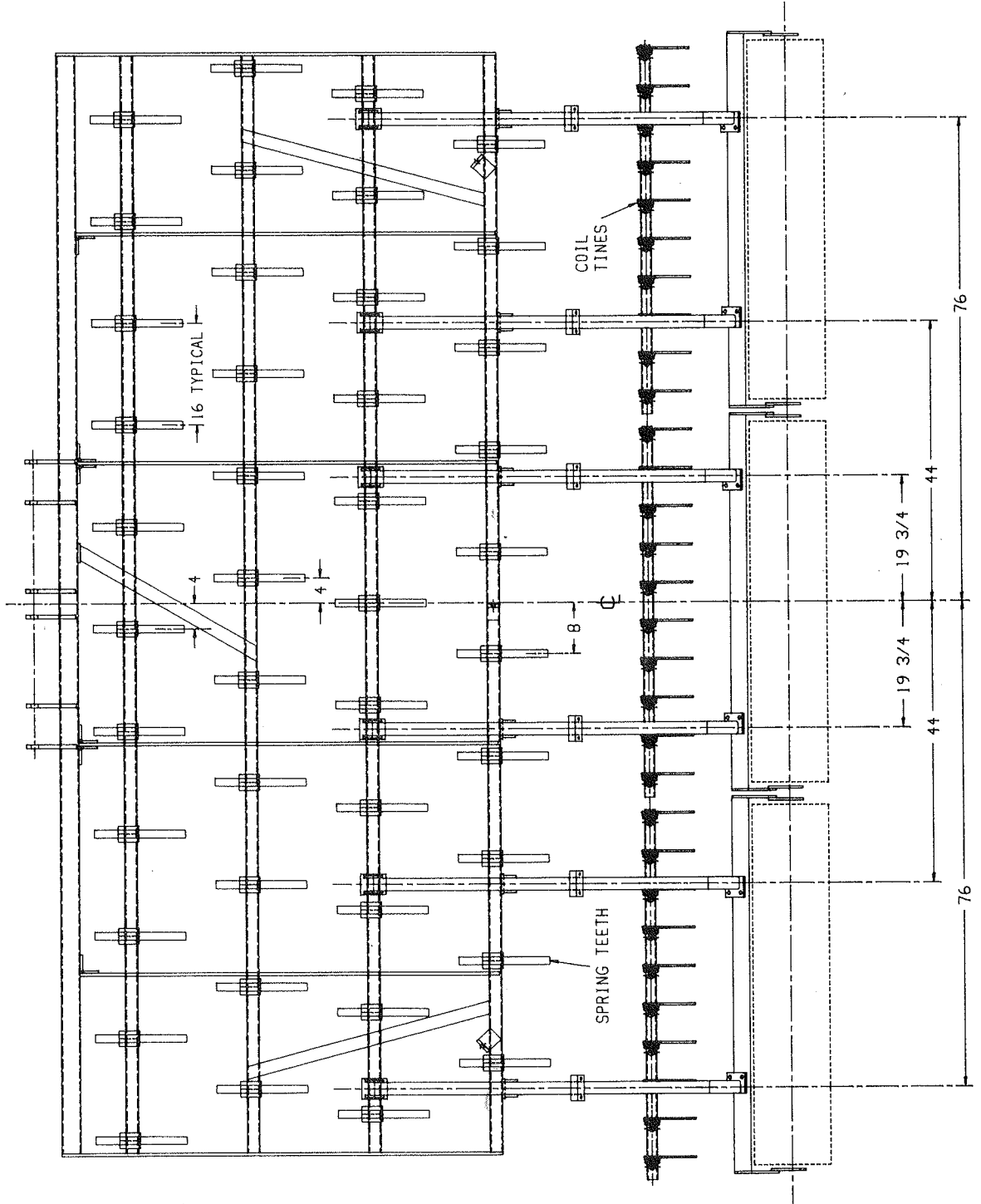


FIGURE 10

18' MACHINE WITH 6" SPRING TOOTH SPACING

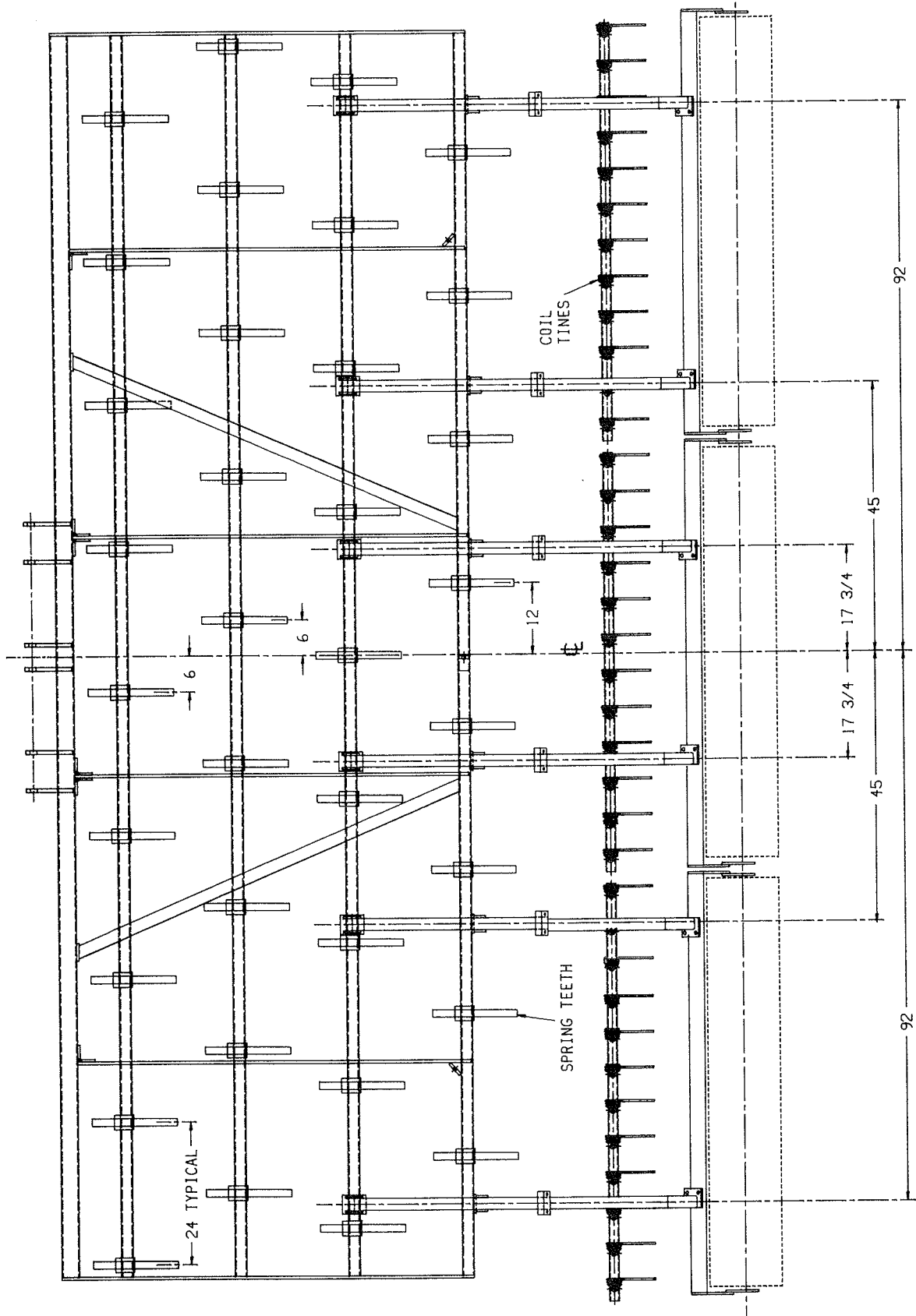


FIGURE 11

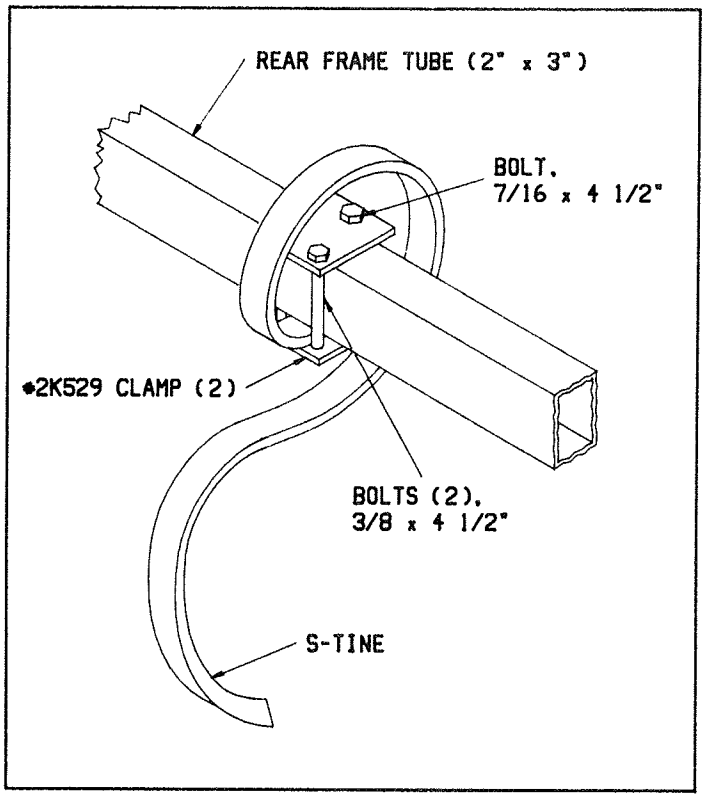


FIGURE 13

Now position the left hand and right hand support beams into these brackets as shown in Figures 7 through 12 and in Figure 14. Attach the support beams to the mounting brackets with 5/8 x 3-3/4" bolts and lock nuts. **IMPORTANT:** Use bottom hole in mounting bracket if your machine has "standard" spring tines, or top hole in bracket if equipped with "high clearance" tines (see Figure 4 for spring tine identification). Snug up lock nuts but allow enough freedom for support beams to pivot.

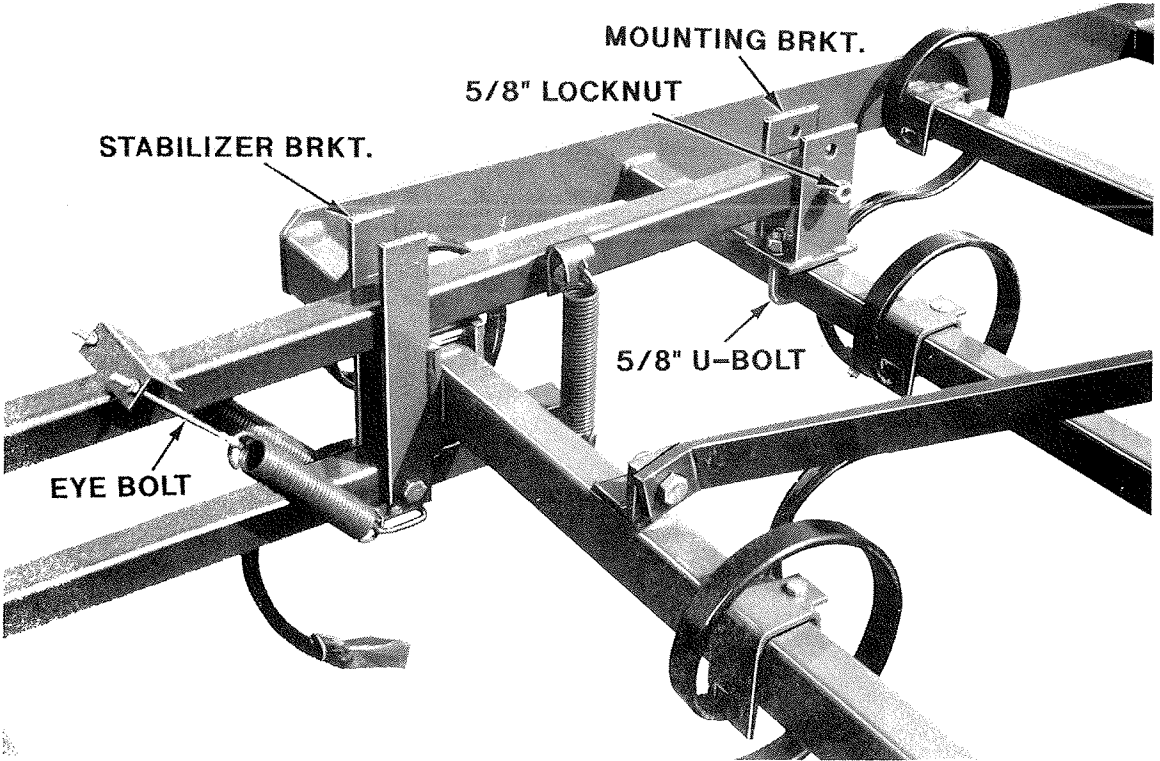


FIG. 14

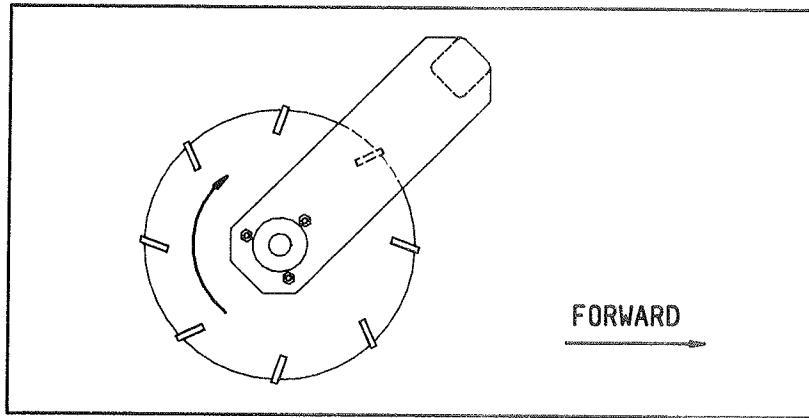


FIGURE 15

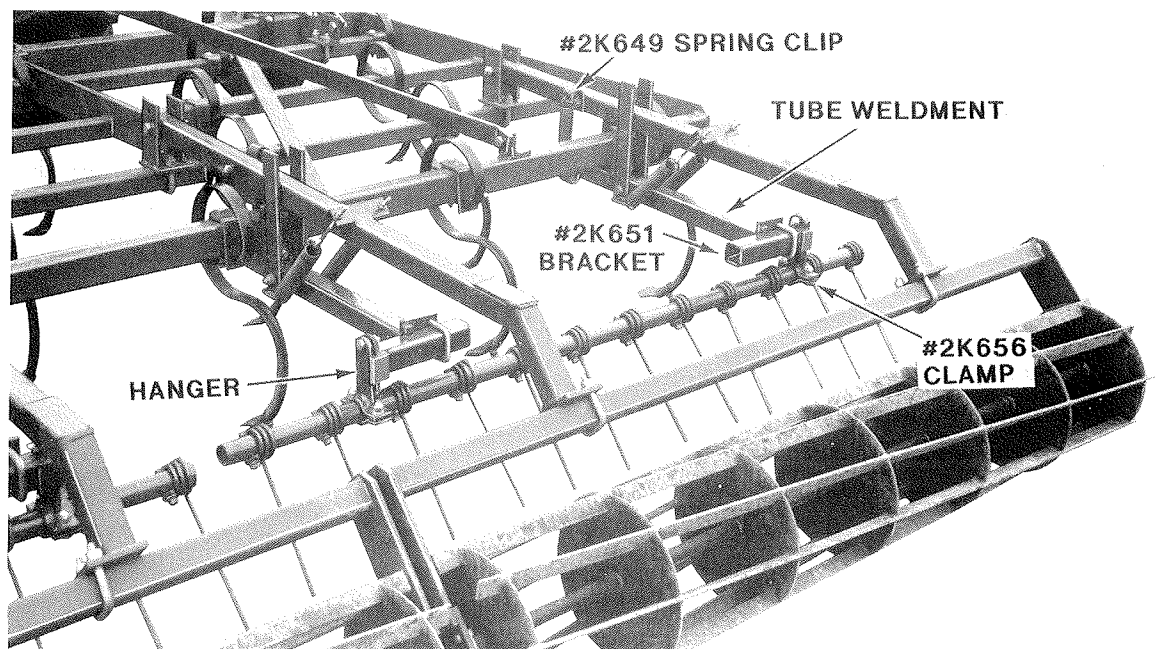
Next, see Figure 15 for direction of rotation. Then attach the harrow reel assemblies to the support beams with the 1/2" u-bolts, lock washers, and nuts. Do not draw nuts up tight as yet. Arrange the set of harrow reel assemblies such that it is centered behind the cultivator; so that the reels overlap the working width of the spring teeth equally on both sides of the machine. Allow 3/4" clearance between harrow reel frames. Now tighten nuts on u-bolts. Check to see that reel assemblies can float, as when field working, without interference.

Next, assemble a pair of spring and eye bolts to each support beam. See Figure 14. Attach one end of the springs to the clips on the bottom of the stabilizer brackets. Attach eye bolts to the other end of springs and insert eye bolts through the angle brackets on the support beams. Install 5/16" lock nut and tighten until 1-1/4" of eye bolt extends through lock nut.

Coil Tine Leveler

Refer to exploded view in Repair Parts Catalog which depicts a machine with standard spring teeth. Also see Figure 16. Now attach the #2K640 tube weldments to the stabilizer brackets with 5/8 x 3-3/4" bolts and lock nuts. IMPORTANT: Note that the holes in these tubes are drilled "off center". The larger hole should be closer to the bottom of tube if your machine has the "standard" spring teeth. If you have "high clearance" spring teeth, flip tube weldment over and assemble so the larger hole is closer to the top. Snug up lock nuts but allow enough freedom for tube weldment to pivot.

FIG. 16



Next, attach the #2K651 brackets to the tube weldments with 1/2" u-bolts, lock washers, and nuts but do not tighten at this time. (Note: On the 18' machine with 4" tine spacing, the second bracket in from the left should be assembled in opposite direction shown; so it is in the same direction as the first bracket in from left.) Attach the #2K653 hangers to the #2K651 brackets with 1/2 x 1-1/2" bolts and lock nuts. Allow just a slight looseness for hanger bracket to pivot. Note that #2K651 bracket allows hangers to pivot forward but not rearward.

Next, arrange pipe and coil tine assemblies so they are centered behind the working width of the spring teeth and with all coil tines 6" apart. This places the end coil tine to strike the dirt 3" beyond the outer spring tooth on both sides of machine. Now assemble the pipes to the hangers with #2K656 clamps, 1/2 x 1-1/2" bolts, lock washers, and nuts. Set coil tines so they are pitched about 30° rearward when working and tighten nuts securely. Also tighten nuts on the 1/2" u-bolts at this time.

Now assemble the #2K649 spring clips to the harrow reel support beams and to the #2K640 tube weldments. They can be assembled on either side, whichever provides the most clearance with spring teeth. See Figure 16 and the exploded view in Parts Manual. Use 3/8 x 2-3/4" bolts, lock washers, flat washers, and nuts. Then attach a #4D242 spring between each pair of clips. Take up the spring slack with the slots in spring clips and tighten fasteners. Be sure bolts are tightened securely as springs could be lost if spring clips loosened.

Gage Wheels (Optional)

Assemble gage wheels to the lugs on the front corners of machine. See Figure 3 in the Operation section and exploded view in the Repair Parts Manual. Attach with 1-1/8 dia. x 5-5/8" long pins and secure with 1/4 x 2" roll pins. Attach the adjustment straps and secure with hairpin cotters.

Hitch Pins and Spacers

Assemble hitch pins and spacers to the hitch lugs and mast as described in Figure 1 or Figure 2 of the Operation section.

Points (Shovels)

One box assembly contains all points and attaching hardware. There are two #2J155 reversible points provided for the outer left and outer right spring teeth. All the rest require 2-3/4" duckfoot points (provided as "standard" with the machine).

S.M.V. Bracket and Reflective Decals

Attach the S.M.V. bracket to the rear frame tube. (See exploded view of frame components in Repair Parts Manual). Attach it as close to the center of the machine as practical using the strap and 5/16" fasteners provided.

Install reflective decals. Put the amber decals on the front 4 x 3 frame tube and the red decals on the rear 3 x 2 frame tube. Install as close to the outside ends of the machine as practical.

