

Manufacturers of **NORWOOD** and **CRANBROOK** handweaving
looms and equipment

Instructions for assembly: the **CRANBROOK** loom

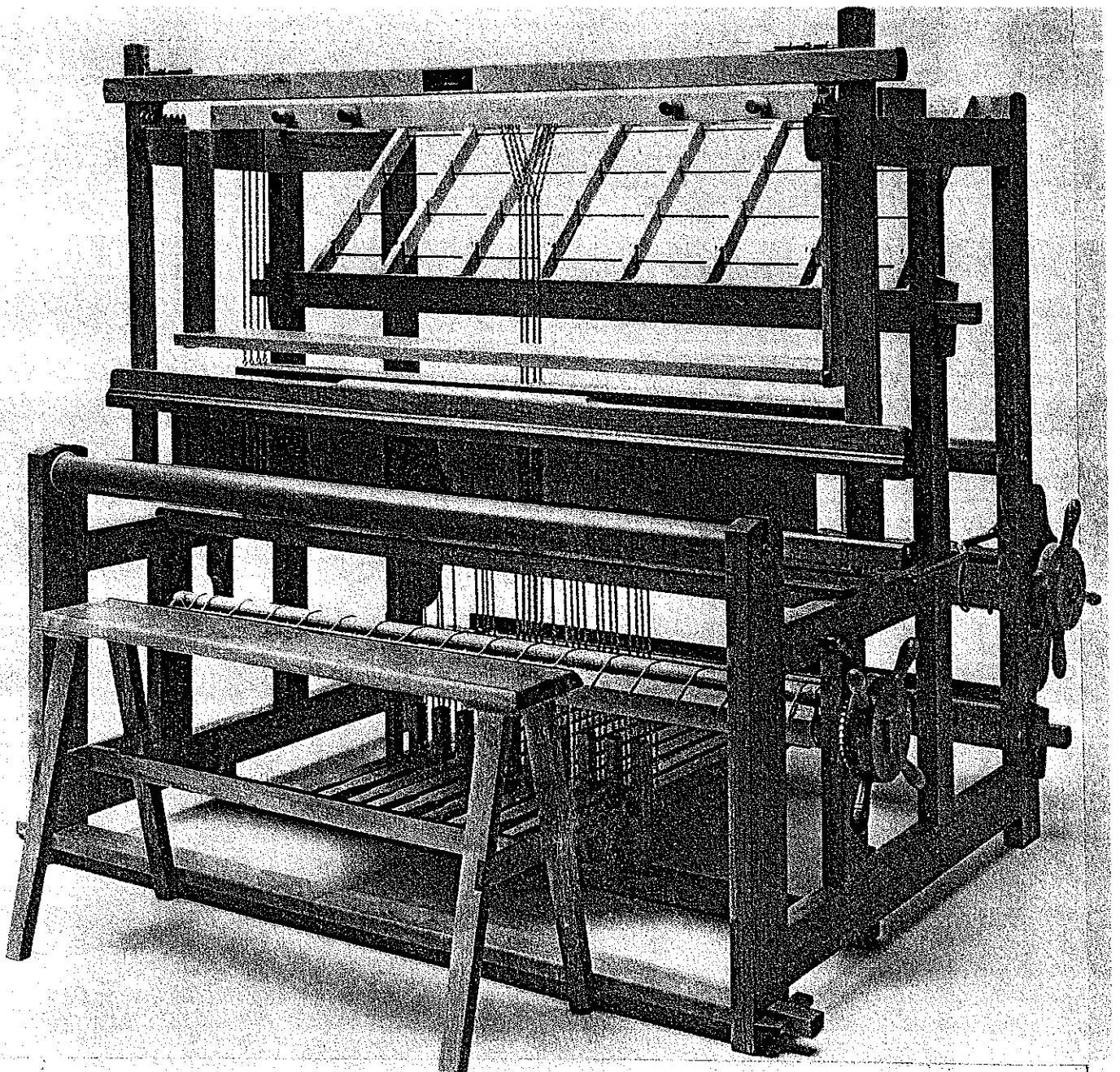
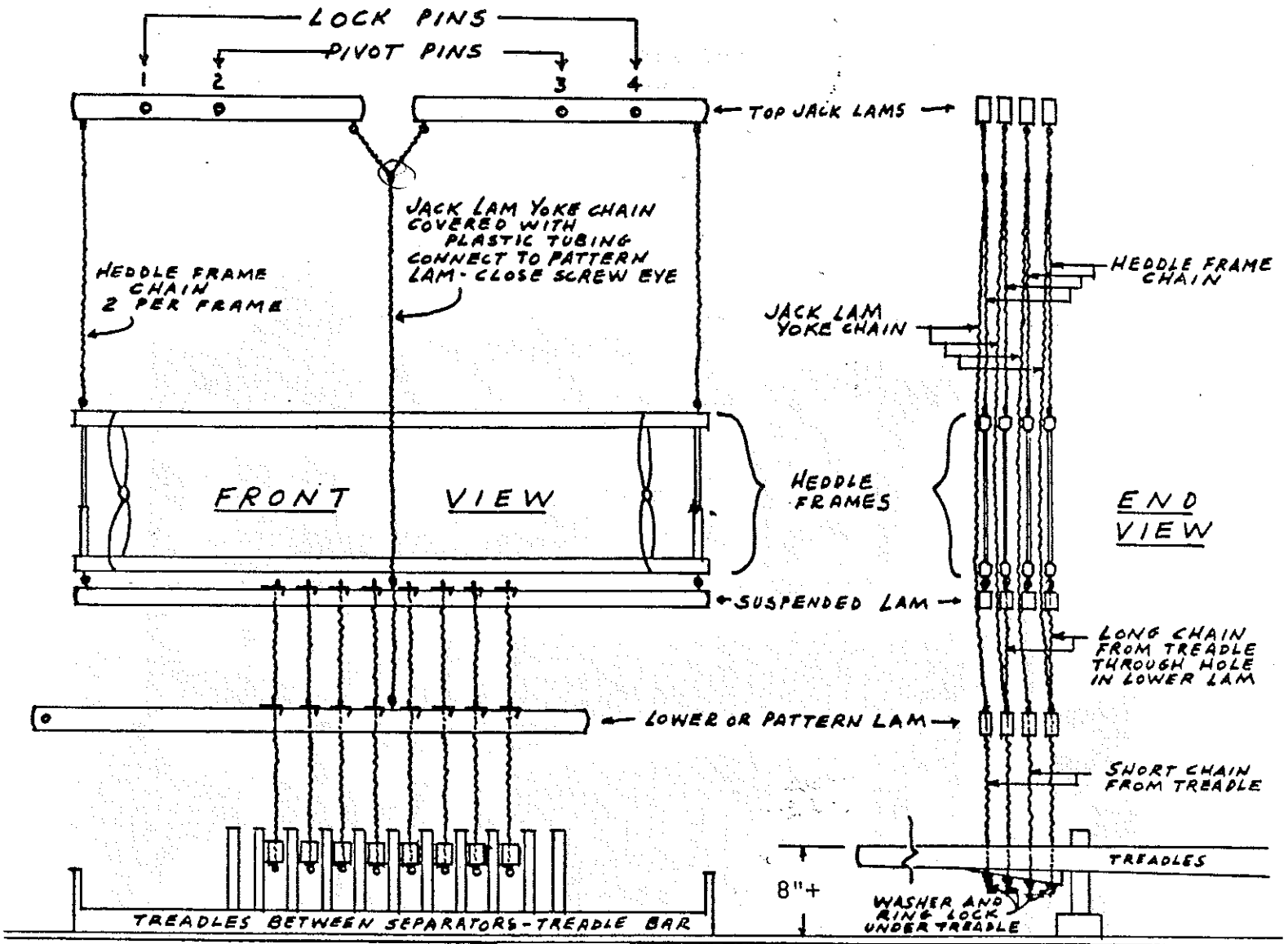
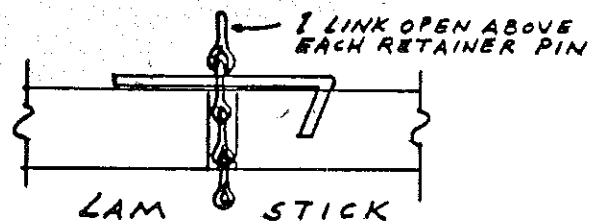


DIAGRAM OF TIE-UP SYSTEM FOR THE CRANBROOK LOOM



Right: Correct use of chain retainer lock pins used on top edge of suspended lams and pattern lams.



PART I - BEGIN ASSEMBLING THE LOOM

Refer to Photograph.

1. To set up the loom side frames, insert the three cross bars in the square holes. The cross bar with steel shaft held by wooden brackets is located at the rear of the loom under the warp beam. This shaft must be on the lower edge of the cross bar. Insert wedges in the cross bar ends and lock in with light pressure.
2. Place the treadle separator bar on the floor between the side frames. Make sure the higher end of the bevelled slots in the dividers face the back of the loom. Line up the slots in the end pieces with the pre-drilled holes in the side frames. Fasten each end with the 2 screws and washers provided. These slots provide upward adjustment to ensure that the treadles will lock under variations in degree of action.
3. Install treadles on the steel shaft of the rear cross bar. With one spacer inserted between each treadle, center the treadles in the treadle separator bar. Install the balance of the spacers to fill in the open spaces between the outside treadles and the rod brackets. The entire space between the rod brackets must be filled. This opening is made to accommodate 10 treadles.

The tie-up chain can be threaded through the treadles at this point. Fish the chain up from the bottom of each treadle so the ring and washer retainer is underneath. It may be necessary to thread a short piece of wire or matchstick through each chain to keep the chain from sliding back through the hole.

4. Install the jack lam box at the top of the loom behind the brass beater hanger rack. The large, octagonal end of the lock pins face toward the front of the loom. The two dowel pins on the bottom of either end of the jack box fit into the holes on top of each side frame. Lower the attached chain into position, making sure it is suspended evenly and free of any twist.

The yoke chain is encased in plastic tubing. This prevents the chain from cutting into the heddle frames during operation. Excessive wear on the tubing may expose the chain. Replace plastic tubing as required to prevent damage to finish and to the wood surfaces.

The jack lams are positioned in the front half of the jack lam box. To align properly, the tie-up chain must run through the front 4 holes of the treadles with 4 harness operation. If more space is required between the breast beam and beater, or if there is an excessive amount of material on the cloth beam, the jack lams may be moved to the rear half of the lam box and the tie-up chain run through the rear 4 holes of the treadles. No adjustment for increased space is possible if 8 harnesses are employed.

Jack lam box pins: The lock pins are numbers 1 and 4 (the outboard pins). Leave the lock pins in place during tie-up, if adjustment is required, or if the loom has to be moved. Lock pins must be removed to operate of loom. The pivot pins are numbers 2 and 3 (the inboard pins). These should be removed only to install additional jack lams or to reposition the existing jack lams to the rear half of the lam box.

5. Thread the heddles onto the heddle frames and distribute them evenly. Lift heddle frames into position and attach the outside chains from jack lams to the screw eyes located at each end of the heddle frames. The top bar of the heddle frames have only 2 screw eyes, one at each end. The bottom bar of the frames have 3 screw eyes.

The harness frames can be disassembled to simplify installation of the heddles. The metal assembly at each end of the frames consists of a moveable sleeve over a 2 piece metal rod. Slide the metal sleeve upward bar to break the heddle frame into two sections. After the heddles are strung, realign the metal rods end to end and carefully, with some pressure, straighten the frame against the tension of the heddles. Slide the metal sleeve down over the rod joint to lock the frame in place. Do not bunch the heddles on the frames. Uniform tension on all heddles is necessary to insure a good shed and is best achieved by keeping the heddles evenly spaced and separated over the length of the heddle frame. If you are using polyester heddles, it may be necessary to cut the loops above and below the harness frames in order to separate the heddles and distribute them evenly.

6. Mount the lower lams on the steel shaft located in left side frame. The single screw eye on each lam goes on top. Install the lams toward the front of the loom with one $\frac{1}{4}$ " spacer between the bracket and the first lam. Each lam must be separated by one $\frac{1}{4}$ " spacer. Place the remaining larger spacers on the shaft to fill the entire opening.

PART II - INSTALL THE COUNTERMARCHE TIE-UP

Refer to tie-up diagram on Page 1.

The type and location of the treadle chain used are determined by the pattern to be woven. Refer to the standard tie-up diagrams shown on Page 6.

1. Two metal 'S' shaped wire hooks are provided to temporarily hang the suspended lam from the heddle frame. Begin with rear heddle frame and hang one S-hook in each screw eye of the lower heddle frame bar. Hook the suspended lam on the S-hook. Lift up the rear lower lam and hook the plastic covered jack lam yoke chain to it. (The chain should pass in front of the heddle frame.) The screw eye may then be squeezed closed with pliers to prevent the chain from slipping off. Install the long chains from the treadles to the suspended lam first. Thread the chain through the holes in the treadles, lower lams, then suspended lams using the wire hook provided. Use the retainer pin to attach the chain to the top edge of the suspended lam as shown on Page 1. Hook the remaining long treadle chain to the rear suspended lam in this manner. Remove the S-hooks and attach the suspended lam to the corresponding screw eyes on the lower heddle frame bar.

Next, thread the short treadle chains through the treadles and the rear lower lam in the same manner. Lock them in place with retainer pins. This will complete the tie-up of the rear harness assembly. Proceed to the next heddle frame in sequence from back to front and repeat.

2. Make sure that each heddle frame operates correctly by removing Lock Pins #1 and #4. Depress each treadle in sequence. Corresponding frames should raise and lower as each treadle is depressed as dictated by the pattern draft. If a treadle sticks and frames will not operate, one or more lams have been incorrectly connected. Replace the lock pin and re-check the tie-up.
3. If each harness frame assembly is operating satisfactorily, check the height of the treadle separator bar. All treadles should lock in slots when depressed. Adjust the height of the treadle bar as required, then tighten all screws or bolts to prevent the bar from slipping.
4. Replace the lock pins and install the balance of the loom parts according to the instructions on Page 8.

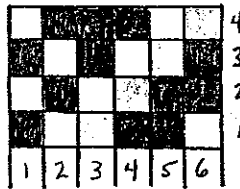
CHECK THESE POINTS TO INSURE MAXIMUM SHED AND HARNESS ACTION:

1. All parts of the harness system - heddle frames, suspended lams, lower lams and treadles - must be in a parallel vertical plane.
2. The center of the heddle eye must intersect the center of the warp line (a straight line from the top of the front and rear tubular steel breast beams).

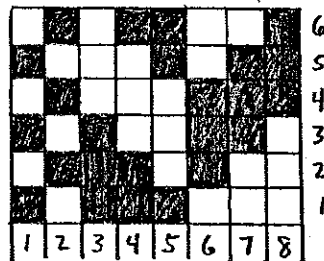
The amount of chain supplied with each loom is based on the number of harnesses and treadles ordered for the harness system. The combination of long and short chains from the treadles to the lams, and their location is determined by the following pattern drafts. The two drafts indicate the tie-up patterns we supply with each loom for the particular harness-treadle combination ordered with the loom. These diagrams represent only two possible tie-ups. Countless other variations in the weaving pattern may be obtained by using other tie-ups. Odd and even numbers of both treadles and harnesses may be employed in any combination to produce a desired pattern.

Additional chain lengths for treadle to lam hook-up may be purchased if the right combination of long and short lengths has not been supplied for a specific pattern. When ordering, specify Loom Serial Number, Model Number and specific location of chain in the harness system.

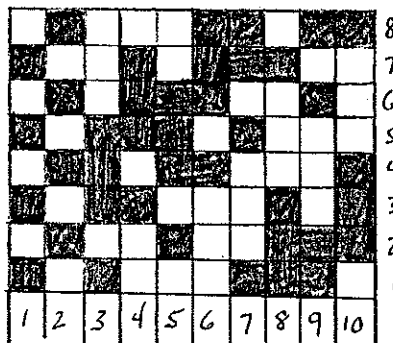
four harness,
six treadle
tie-up



six harness,
eight treadle
tie-up



eight harness,
ten treadle
tie-up



Shaded squares indicate tie-up from treadles to lower lams. Use short chain supplied. Open squares indicate tie-up from treadles to suspended lams. Use long chain supplied. Heddle frames rise in shaded squares; sink in open squares.

ADJUSTING THE COUNTERMARCHE TIE-UP

Each harness has an upper (suspended) lam, lowering which lowers the harness, and a lower (hinged) lam, lowering which raises the harness. The important thing to realize is that each harness with its attached jacks and lams is a separate entity and its movements are not related to the other harnesses. It is only the treadles that control the harnesses movements. This means that perfect sheds are possible whatever number of harnesses are raised or lowered.

All the tie-up work on a countermarche loom should be very carefully done. The jacks are first immobilized using the lock pins and the height of the harnesses checked. When viewed from the side, the line of the warp from the front to back beams should bisect the center of the harnesses. The long chains from the jacks to the lower lams should be adjusted so that the lams point slightly upward.

There is a tendency, especially with the larger looms, for the harnesses to drop when the lock pins are removed. This is generally overcome by the tension of the warp. One way to correct this is to adjust the treadle chain so that the weight of the treadles falls on the lower lams only. First pin the long treadle chain at the suspended lam in the fourth link. Then when all the treadles have been tied to the lams with equal tension, drop the long chain at the suspended lam to the second link. This throws the weight of the treadles to the lower lams and by correcting the balance prevents the harnesses from dropping.

In order to get an even shed, each harness must either rise or fall slightly more than the one in front of it. Using eight harnesses, the eighth harness may have to rise and fall about an inch and a half more than the first. If the tie-up chains become progressively tighter toward the back of the treadle, when the treadle is lowered the rear harnesses will be raised and lowered more than the front. The treadles on the Cranbrook loom are tapered to achieve this effect. If the chains are tied at equal lengths from front to back, the shape of the treadle effectively tightens the rear chains.

To produce equal sheds from all treadles, those on the right must be depressed more than those on the left. This is because the right treadles are attached to the lams farther from the pivot point. In order to allow for this greater movement, the treadles should hang higher on the right. This is easily accomplished by placing a board crosswise under the treadles and propping it up slightly higher on the right side. Then adjust the tie-up accordingly.

PART III - FINISH ASSEMBLING THE LOOM

Loom Models 73 and 97 require special instructions. See Page 11.

Refer to photographs for proper placement of parts.

INSTALL WARP BEAM (largest of 2 octagonal beams)

Location: Within the bearing blocks mounted on the back of the side frames.

1. Lift out the retainer pins from the bearing blocks and remove the wooden inserts. These slide out on dowel keyway only one way - toward the outside of the loom.
2. Slide the warp beam into place into the open slots. Make sure the metal gear is toward the right side frame against the pawl. (This will be at your left as you face the back of the loom.)
3. Replace the insert blocks (making sure to match the numbers) and the retainer pins.
4. Your loom is equipped with a new warp beam release lever mounted to the inside of the right side frame. This lever replaces the curved tubular metal handle shown in the photographs. This new design enables you to release the warp beam while at the front of the loom.
5. The warp beam turn wheel is the round, wooden wheel with handles and a large square hole through the center. Place the turn wheel over the square end shaft of the warp beam on the right side.
6. The warp beam includes a rope and tie-on bar for attaching the warp. The beam rotates counter clockwise toward the front of the loom as the warp unwinds from the beam during weaving.

INSTALL CLOTH BEAM (smaller octagonal beam, with canvas apron)

Location: Near front of loom within 2½" diameter holes.

1. Loosen the wing nuts and remove the "V" shaped block in the right side frame. Do not remove the bolts.
2. Install the end of the cloth beam with the short shaft into the hole of the left side frame. Place the opposite end of the beam with the square shaft into the "V" block opening. Use some pressure while turning the beam to make sure the beam is fully seated in the hole.
3. Replace the "V" block, matching the numbers for a proper fit. Replace the washers and wing nuts.

4. Place the cloth beam turn wheel with the attached metal gear over the square end of the cloth beam shaft on the right side. Make sure the wheel is seated to the full depth of the shaft. Align the gear with the pawl attached to the side frame. Fasten the turn wheel to the shaft with the screw taped in the face of the turn wheel.
5. The cloth beam has a canvas apron with two tie-up sticks attached to secure the warp. The beam rotates clock-wise when weaving.

INSTALL KNEE BEAM (1-3/4" x 2-1/2" Maple with notched ends.)
(For Model 73 and larger, see special instructions)

Location: Within the slots of the side frames directly over cloth beam. The top faces have rounded edges.

Purpose: To provide additional knee room within loom. Finished woven material must pass over top of knee beam to the cloth beam below.

INSTALL FRONT AND BACK BREAST BEAMS (coated steel tubes)

Location: Front - in the slots on top of front posts of each side frame. Back - in the holes in each side frame above the warp beam.

Parts included: 2 plastic washers, 2 steel washers, 2 three inch long bolts for each beam.

Application: Use one steel washer under each bolt head on the outside of the side frame. Use one plastic washer between each end of tube on the inside of the side frame.

1. Front Breast Beam:

Place washers on bolts in proper sequence (steel washer first, then plastic washer). Thread bolts about 1/2" deep into fittings in tube ends. Place tube with bolts over slots in side frame, position washers and slide assembly down to bottom of slots. Hand tighten bolts as far as possible.

2. Back Breast Beam:

Loosen or remove the crossbar wedges in order to slightly spread the side frames. Insert 1 bolt with steel washer full length into the hole in one of the side frames. Place one plastic washer over the bolt on the inside of the side frame. Slide the the other bolt in the opposite hole just far enough to hang the plastic washer on it on the inside of the opposite side frame. Hang one end of the tube over the first bolt. (Let it hang on the inner wall of the tube.) Hold washer & bolt in place at opposite end and guide the tube into position over the plastic washer. Align the bolt with the threaded end fitting inside the tube and tighten a few turns by hand. Fasten the other end by holding plastic washer in place while partially withdrawing the bolt. Align the bolt with the threaded end fitting and tighten. Using a wrench, tighten all four breast beam bolts. Push all crossbar wedges in securely.

INSTALL BEATER (Beater assembly consists of pull bar, top swing bar, and a grooved lower bar with two end uprights attached.)

Location: The beater hangs from the bronze rack at the top front of each side frame. These beater hanger racks are notched for 7 position adjustment. The bronze hangers on the bottom of the top swing bar rest in the notches of beater hanger rack.

1. Forward & Backward Adjustment:

The notches of the hanger rack allow control of the depth of the weaving space. Maximum shed is attained with the beater against the front heddle frame. A light tension spring may be fastened with screw eyes between the lower beater bar and the center post of one of the side frames. This will hold the beater at the position where the widest shed occurs and will also increase the depth of weaving space.

2. Height Adjustment:

The slide bolts on the top of the beater swing bar engage the holes in the two end uprights to govern the height of the beater. With the beater hanging freely, the warp line should bisect the center of the reed. To adjust, hold the beater upright in one hand and slide the bolt out of the hole with other hand. Move the upright up or down as required and re-engage bolt. Roll the bolt locking handle down into the slot to keep the bolt from sliding out. Repeat this procedure on the opposite side to complete the adjustment.

3. Alignment of Beater:
The beater must be perfectly parallel with the front breast beam. This alignment should be checked periodically; especially if the loom has been moved or is subjected to severe climactic changes.

With your hand in the center of the pull bar, push the beater forward slowly. Both ends of the beater should touch the side frames evenly. If they do not, alignment is required. The slotted screw holes in the base of the beater hanger provide this adjustment. Loosen the screws and tap the racks lightly with a hammer, either forward or backward, until the beater is aligned. Tighten the screws securely.

4. OPTIONAL LOCATION OF BEATER (Possible with 4 harnesses only)
If additional depth of weaving space is required, the beater may be relocated as follows:

- A. Move the jack lam box to the rear hole on the top of the side frames.

- B. Move beater hanger rack 6" further back. Pilot holes for the rear screws will have to be drilled.

- C. Move the lower lams to the rear of the mounting space by reversing the spacer assembly.

- D. Relocate all tie-up chain to the rear four holes in the treadles.

This modification will increase the weaving space to a depth of 18 inches. This option is NOT possible with a 6 or 8 harness hook-up.

WARP STICKS (One bundle of 16 pieces)

Thin wooden slats used as warp separators to insure even tension as the warp is wound on the beam.

LEASE STICKS (One pair)

These control the shed or cross of the warp threads after the warp is on the loom.

SPECIAL ASSEMBLY INSTRUCTIONS FOR LOOM MODELS 73 AND 97

ITEM 1 - page 3:

One cross bar has one or more cleats fastened to one face. Install this cross bar at the front of the loom with cleats against the floor.

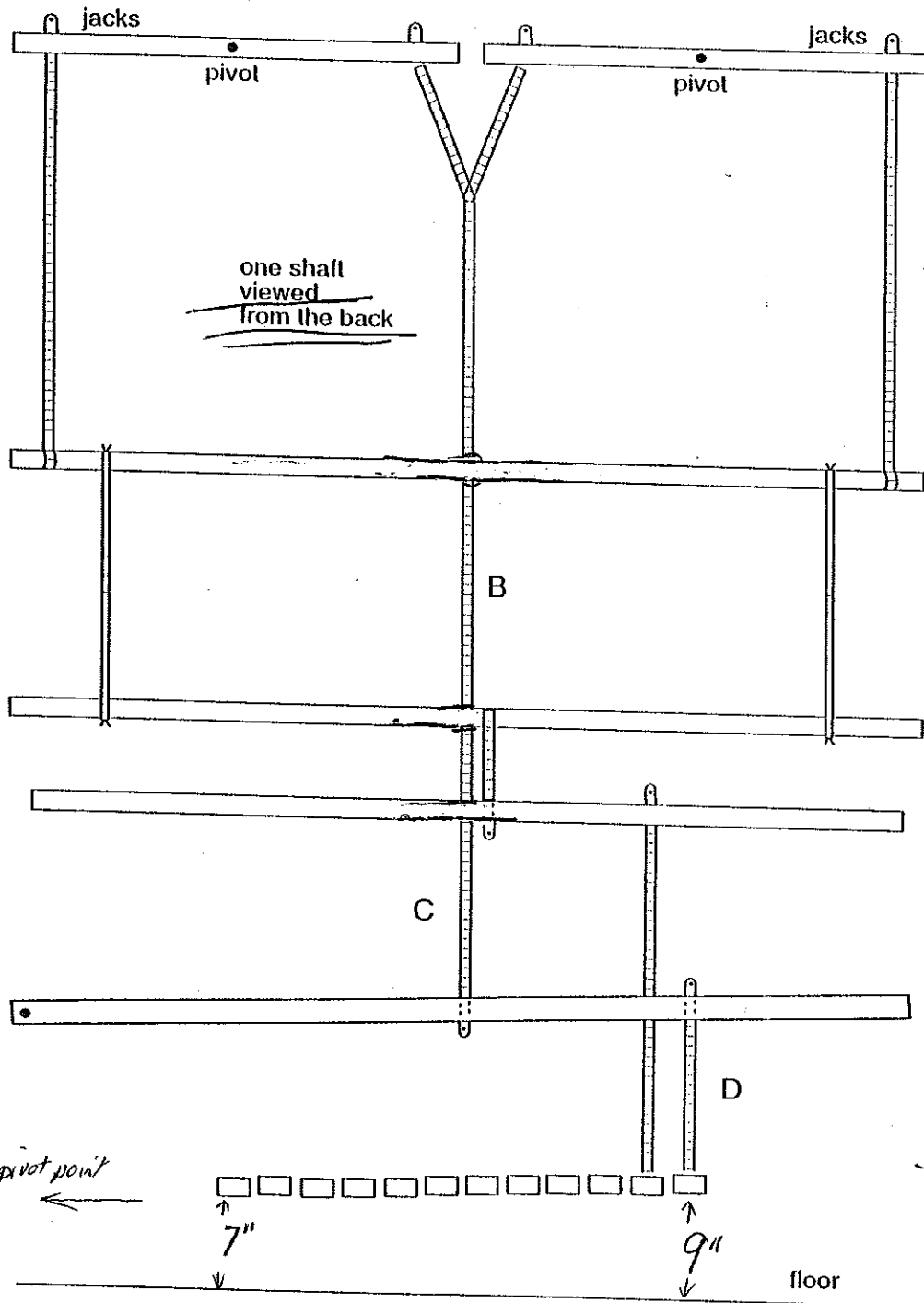
ITEM 2 - page 3:

The treadle separator bar is supplied with a wood angle support at each end to provide lateral strength when a treadle is locked in the slot. Install the treadle bar within the loom and attach vertical end pieces to side frames with screws provided. Pre-drilled holes are located on the inner face of the center vertical member of each side frame. Holes in bar ends are slotted to permit vertical adjustment. Each angle support has a slotted hole at the bottom and is fastened to the flat bar with bolt and nut provided.

The slotted hole in the angle bar permits additional adjustment in case one end must be raised to achieve uniform locking of treadles. To raise one side, loosen bolt at lower end of angle bar and loosen screws in vertical end pieces. Adjust to required height, then retighten bolt and screws. Check Item 2, page 3, regarding position of bevelled slots in treadle dividers.

The knee beam supplied for the Model 73 and larger models is a round steel tube of the same type and size as the front and back breast beams. Attach this in the same manner as the breast beams using the two $\frac{1}{2}$ " x $2\frac{1}{2}$ " bolts provided. Install the plastic washer between the end of the tube and the inside surface of the side frame. Place steel washers under bolt head. The holes on the outside of the side frames are countersunk to allow the bolt heads to lie flush with the surface of the wood.

Positions of shafts, upper lamms, lower lamms, and treadles

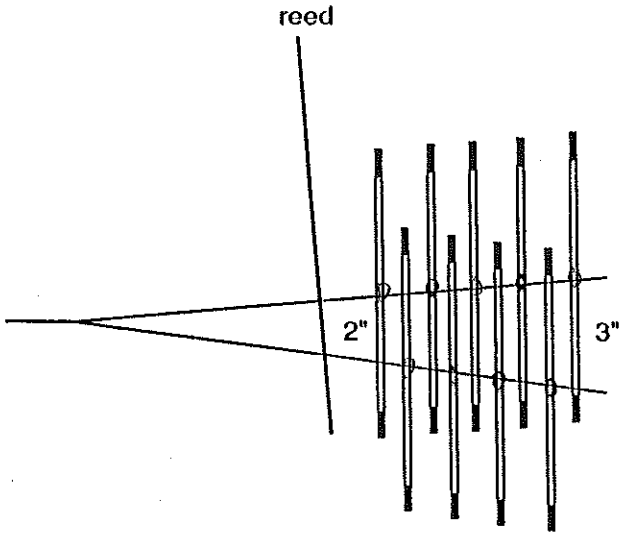


Y cord goes
in front of
shaft +
A upper lamm
+ ties to lower
lamm.

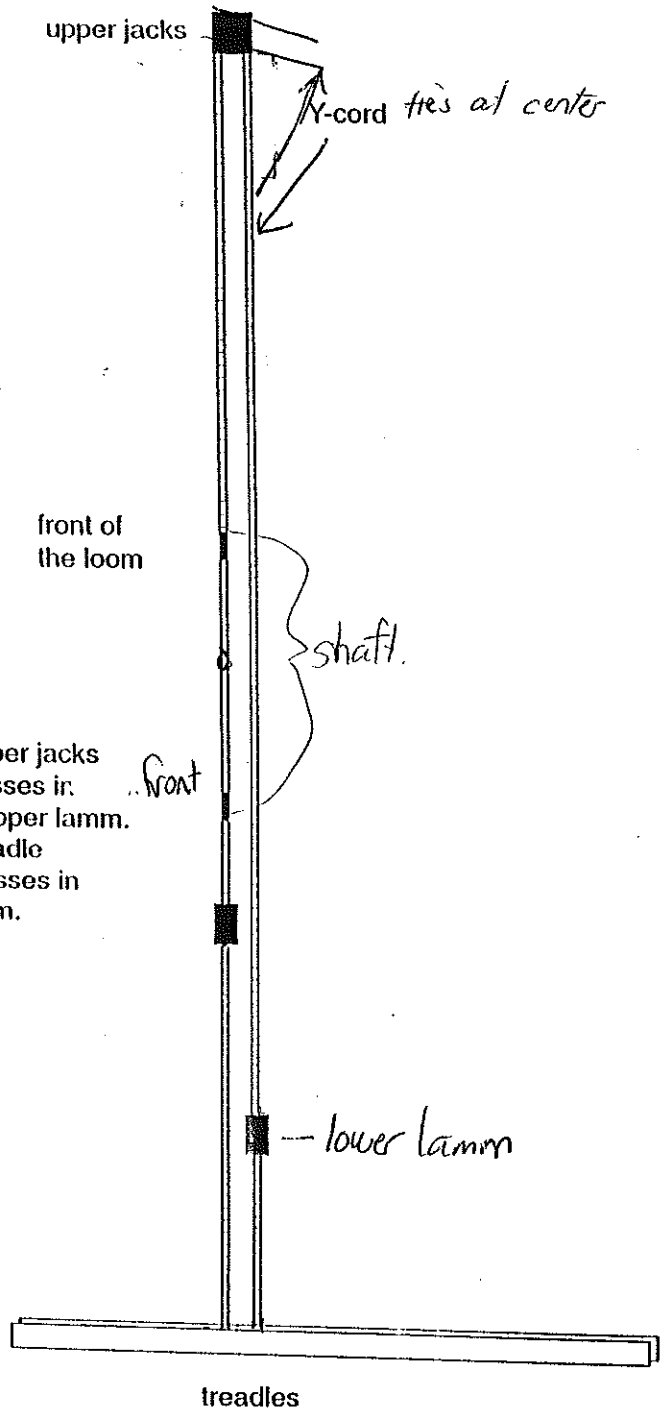
- lower lamms
make shaft rise
(= bottoms up.)

- upper lamm
pulls directly
down

Counter-march considerations



To open the same shed at the fell, the shafts must form a bigger shed the farther away from the fell they are.



The cord from the upper jacks to the lower lamm passes in front of the shaft and the upper lamm. The cord from the treadle to the upper lamm passes in back of the lower lamm.

