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FIGURE INDEX

INTRODUCTION

No doubt you want to get to the business (and the fun) of setting up your loom. Okay, but first a few words of advice. There's probably some of you who don't like to read directions, or think that this manual is entirely too thick and you don't have time to read all the way through it. "Please, read through the directions and follow them step-by-step with us. You will spend less time, and will end up with the loom looking and working as we have planned it."

There are those of you who have never touched a hex bolt and are not even sure you know what one is. To you, we say, "Try it, if you follow the instructions step-by-step and take your time, you will be surprised at what you can do."

To members of the two above camps, and to all those in between, we say "stick with it and we are certain you will find this to be a good experience and a great way to get to know your loom". Remember, if you are at all serious about weaving, a thorough knowledge of your equipment is vital. So think of this as an opportunity, not as a liability.

PREFACE

The two purposes of this assembly manual are:

1. To assist the loom owner in assembling and getting to know his/her loom by providing complete and detailed instructions and drawings.
2. To allow the weaver to enjoy a well cared for and properly functioning loom for many years by providing a care and maintenance schedule.

How to Use This Manual

This manual was written to be read and followed from beginning to end. Some of the information is quite basic and there are those of you who will want to skip those sections entirely. Instead of skipping them we suggest you skim them (there just may be important information hidden right in the middle of a very basic section).

All of the major sections are in the index, in case you need to refer back for any reason.

We at AVL know that a picture is indeed worth a thousand words, and for that reason have included many detailed drawings to help clarify our instructions. Since all of our parts are not numbered, you can use these drawings to help identify certain parts.

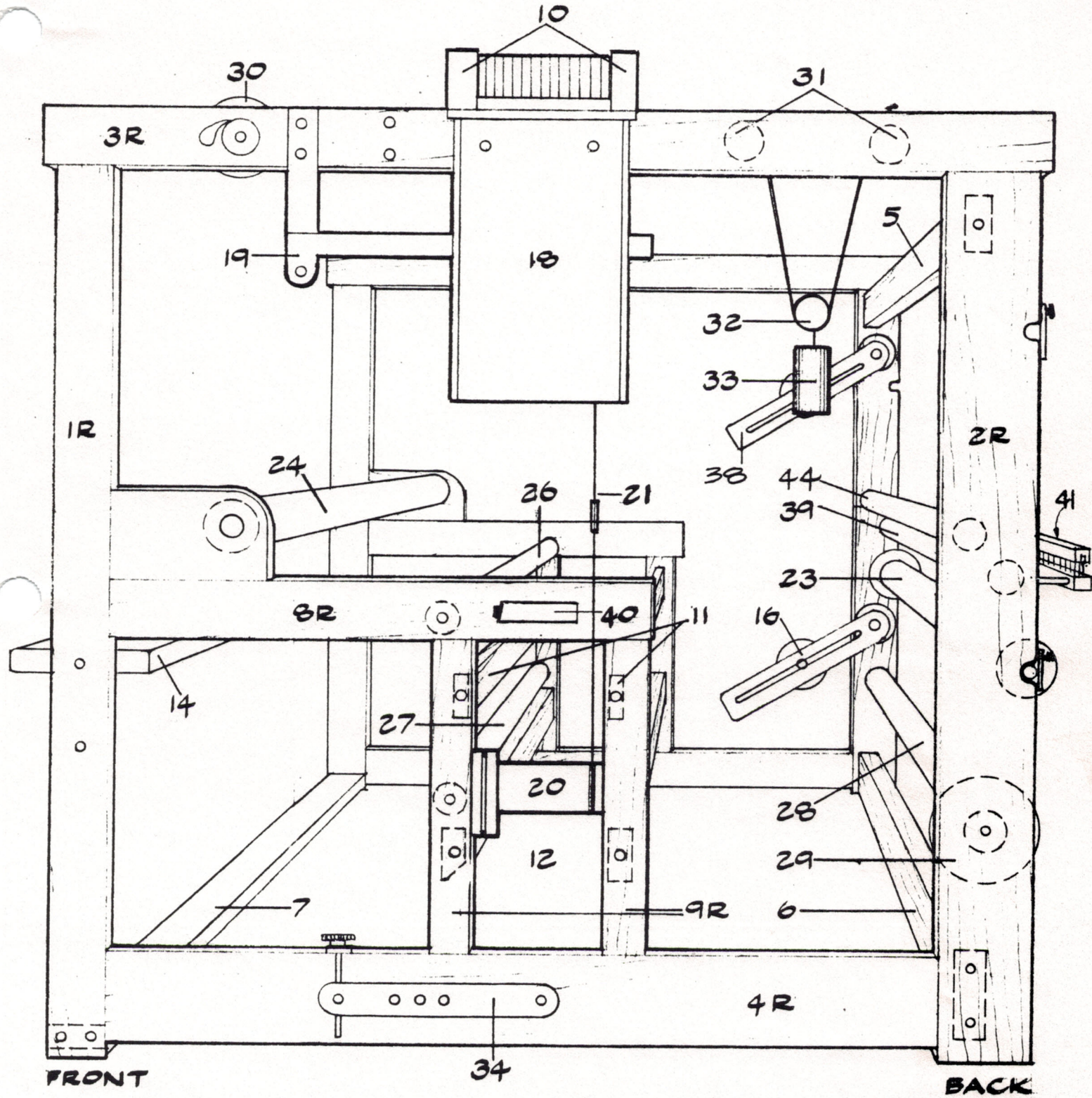
This manual includes assembly instructions for 16 Harness Dobby as well as Modular Looms. Also included are instructions for options such as Rear Cloth Storage System (optional on Modular Loom), Tension Box, Sectional Beam, 2nd Plain Beam, Raddle, Standard Single and Double Box Beaters. You need only read the sections for the kind of loom or options you have ordered.

LOOM ORIENTATION

Before we really get going, there are a few things you should know in order to better understand our instructions. First, and very important, is what we mean when we say "the front of the loom". The front of the loom is the end where the seat is, the back of the loom then, is where the warp beam is. Everything is oriented as if you were sitting in the weaving position. The right side of the loom is the side to your right as you are sitting at the loom, and the left side to your left. A piece marked "bottom" would, of course, go toward the floor.

There are full drawings of the Dobby Loom, as well as the Modular Loom on the following pages. These can be referred to as often as necessary to obtain relative placements of assemblies. Following each of these is a parts number list. Since this list includes the names and part numbers of all parts and assemblies, you may need to refer back to it. Study all of the drawings carefully and make certain that your assembly looks like the one in the drawings before continuing.

The right and left of the Dobby head, for those of you with Dobby Looms, is oriented as if you were standing right in front of it.



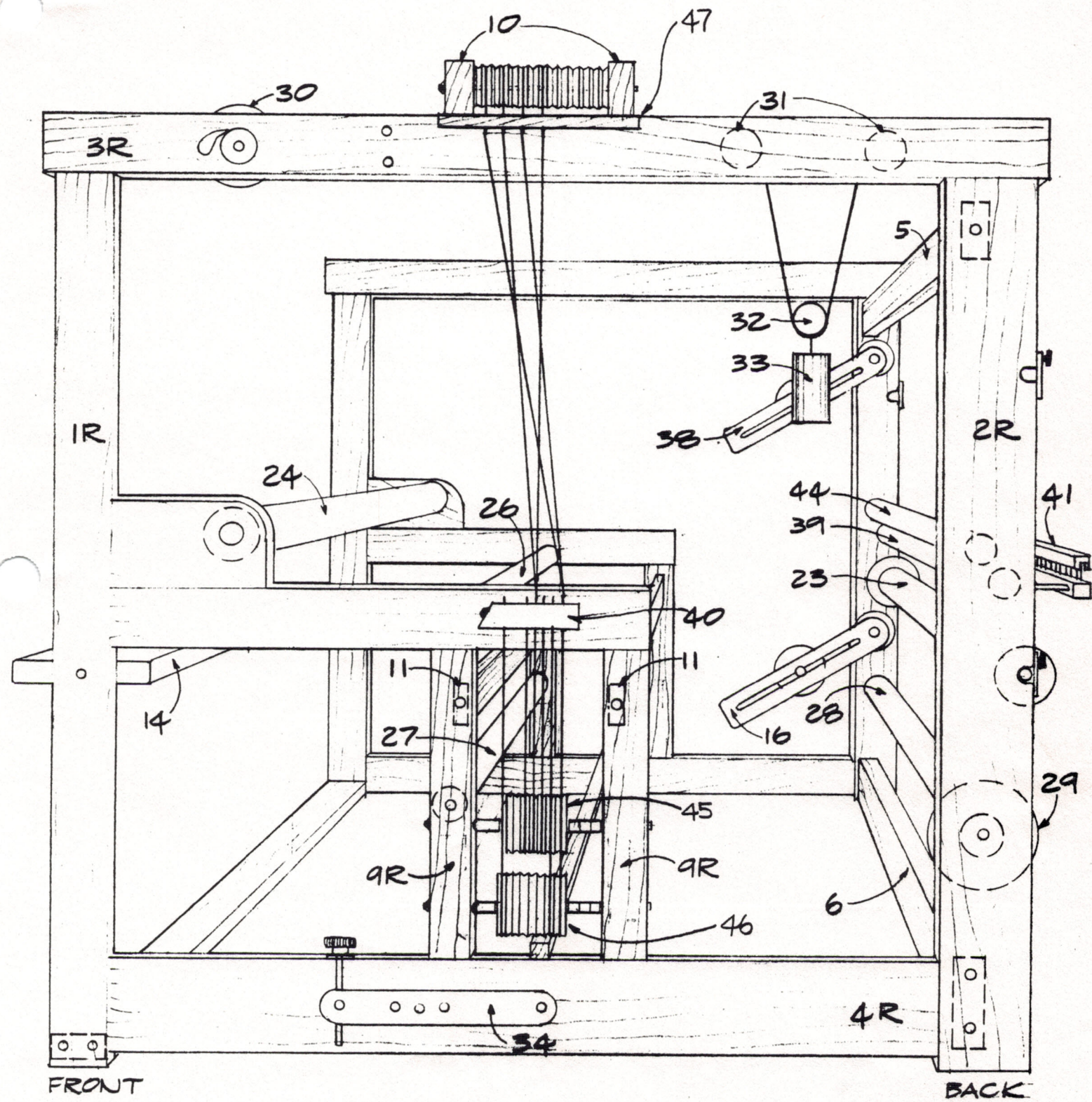
16-HARNESS DOBBY LOOM

FIG. 1

AVL LOOMS
16-HARNESS DOBBY LOOM

Part Number	Part Name
1R	Right Front Vertical Side Frame
2R	Right Rear Vertical Side Frame
1L	Left Front Vertical Side Frame
2L	Left Rear Vertical Side Frame
3R	Right Top Horizontal
3L	Left Top Horizontal
4R	Right Lower Side
4L	Left Lower Side
5	Upper Back
6	Lower Back
7	Lower Front
8R	Right Cloth Beam Support
8L	Left Cloth Beam Support
9R	Right Vertical Support Assembly
9L	Left Vertical Support Assembly
10	Harness Pulley Support Assembly
11	Spring Lever Assembly
12D	Treadle Pulley Assembly
13D	Treadle (Not Shown)
14	Seat
15	Seat Support (Optional)
16	Tension Arm Assembly, Standard
17	Harness Assembly (Not Shown)
18	Dobby Head
19	Dobby Arm
20	Dobby Cam, Cylinder, & Pulley
21	Cable Turnbuckle
23	Warp Beam, Standard

24	Cloth Beam
25	Cloth Beam Ratchet Handle (Not Shown)
26	Upper Cloth Roller
27	Lower Cloth Roller
28	Rear Cloth Storage Roller
29	Cloth Storage Drum
30	Cloth Take-Up Drum
31	Cloth Take-Up Pulleys
32	Counter Weight Pulley/Hanger Assembly
33	Counter Weight
34	Beater Supports (Bottom Swing)
35	Beater (Not Shown)
37	Second Warp Beam (Not Shown)
38	Second Warp Beam Tension Arm
39	Warp Beam Separation Roller
40	Beater Bumpers
41	Raddle
42	Warp Beam Handle (Not Shown)
43	Flyshuttle Cord Supports (Not Shown)
44	Second Warp Beam Separation Roller



MODULAR LOOM

FIG. 2

AVL LOOMS
MODULAR LOOM

Part Number	Part Name
1R	Right Front Vertical Side Frame
2R	Right Rear Vertical Side Frame
1L	Left Front Vertical Side Frame
2L	Left Rear Vertical Side Frame
3R	Right Top Horizontal
3L	Left Top Horizontal
4R	Right Lower Side
4L	Left Lower Side
5	Upper Back
6	Lower Back
7	Lower Front
8R	Right Cloth Beam Support
8L	Left Cloth Beam Support
9R	Right Vertical Support Assembly
9L	Left Vertical Support Assembly
10	Harness Pulley Support Assembly
11	Spring Lever Assembly
12M	Treadle Pulley Assembly
13M	Treadles (Not Shown)
14	Seat
15	Seat Support (Optional)
16	Tension Arm Assembly, Standard
17	Harness Assembly (Not Shown)
23	Warp Beam, Standard
24	Cloth Beam
25	Cloth Beam Ratchet Handle (Not Shown)
26	Upper Cloth Roller
27	Lower Cloth Roller

28	Rear Cloth Storage Roller
29	Cloth Storage Drum
30	Cloth Take-Up Drum
31	Cloth Take-Up Pulleys
32	Counter Weight Pulley/Hanger Assembly
33	Counter Weight
34	Beater Supports (Bottom Swing)
35	Beater (Not Shown)
37	Second Warp Beam (Not Shown)
38	Second Warp Beam Tension Arm
39	Warp Beam Roller
40	Beater Bumpers
41	Raddle
42	Warp Beam Handle (Not Shown)
43	Flyshuttle Cord Supports (Not Shown)
44	Second Warp Beam Separation Roller
45	Upper Side Pulley Assembly
46	Lower Side Pulley Assembly
47	Harness Cable Stop
48	Modular Treadle Pulley Bar

TOOLS NEEDED FOR ASSEMBLY

There are a few tools you'll need before we can get started. These are: a phillips head screwdriver, a light hammer, a pair of pliers, and a four or six inch crescent wrench. A ratchet/socket set is very helpful and will speed up the assembly process but it is not essential.

LOOM ASSEMBLY (DOBBY/MODULAR)

UNPACKING (Dobby/Modular)

The very first thing you need to do is take a nice, deep breath and slowly exhale.

Now you can unpack your boxes, being very careful not to throw any parts away with the packing paper. Remove all strapping tape and bubble pack. Lay all of the parts out so that you will be able to identify each one as they are called for.

IDENTIFYING PARTS (Dobby/Modular)

1. Hardware - Identifying and Measuring

   Pick up your bag marked cross member hardware or x-member hardware. Empty its contents onto a table top. In the bag are hex bolts, carriage bolts, washers, hex nuts, square nuts, wing nuts, allen wrenches, two black knobs and possibly two machine screws. Hex bolts, for those who don't speak 'hardwarese' yet, have a six sided head and are measured for length between the bottom face of the head and the bottom of the bolt threads. The diameter is the thickness of the bolt, measured at the threaded end, and is the distance from one side of the circle to the other. This can be measured with a ruler. Hex bolts always get a washer between the head and the surface of the wood to prevent damage to the wood. Carriage bolts are the ones with rounded heads. They are measured for length the same as hex bolts. Carriage bolts never get a washer between the head of the bolt and the wood. These bolts are always attached at the end with a washer and either a hex nut (a nut with six sides) or a wing nut (a nut with 'wings').

Hex nuts always have a washer between them and the wood, and square nuts always go in 'nut access holes' (see figure 3) and attach with no washer, to a hex bolt.

Machine screws have slots in the head to fit a screwdriver.

Allen wrenches are little 'L' shaped hexagon rods. You'll need these later in assembly.

Finally, the black knobs are for retaining the warp beams.

Now you know all that you need to know about hardware to set up and maintain your loom.

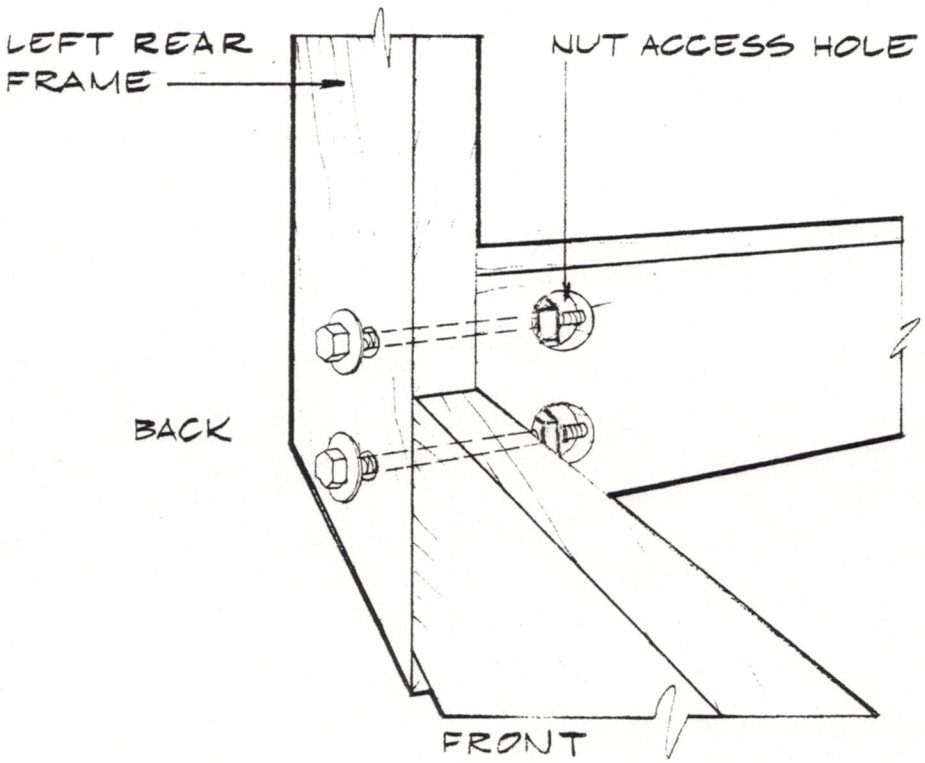
Bolt and Nut Hints

A. If a bolt is a little tight going in the hole, give it a light, friendly tap with a hammer.

B. To start the threads on a nut in a 'nut access hole' it is often helpful to hold the nut in place with the end of a screw driver or the tip of your finger.

C. Always have the large 'nut access hole' (see figure 3) facing toward the inside of the loom unless otherwise specified.

D. Remember to put washers under the heads of hex bolts and exposed nuts (nuts that are not in access holes) to prevent damage to the wood.



ASSEMBLING LOWER LEFT BACK CORNER

FIG. 3

2. Identifying Side Frame Parts (Dobby/Modular)

The side frames are the parts that came in the biggest box. They are shipped with the insides facing each other just as they will be when the loom is set up. To determine which is the right side and which the left, first orient them as they are oriented in figure 1 - i.e., with the wider pieces at the back and the bottom. Now, look at the topmost horizontal piece. The right side will have two pulleys (labeled #31 in the drawing) on the inside.

JOINING SIDE FRAMES (Dobby/Modular)

1. Upper and Lower Backs

Locate the upper back #5, the lower back #6, the warp beam roller #39, and if you ordered a second beam, the separation roller #44. (It would be best if you had a helper for steps 1 and 2.)

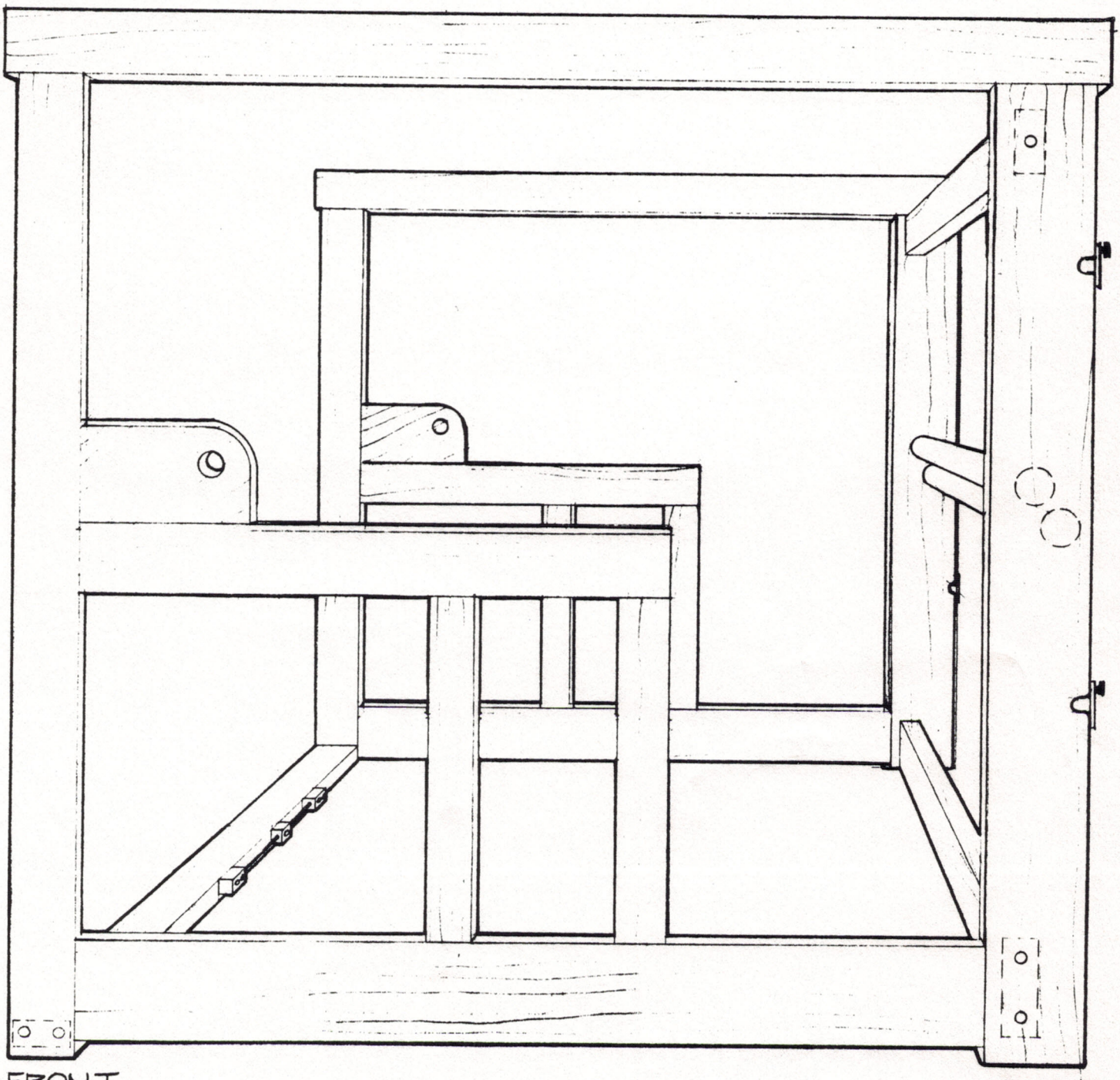
Set your left and right side frames opposite each other with the lower back in between. Remember, the nut access holes face the inside of the loom. Using 5/16" dia x 3 1/4" hex bolts, washers and square nuts, attach the lower back to the side frames. Get the nuts started on the bolts but don't tighten them yet. (See figure 3)

At this point you must install the separation roller #39 and/or separation roller #44. To do this, gently spread the side frames and insert the rollers into the holes provided as shown in figure 1. The separation roller #39 goes into the lower set of holes, and the separation roller #44 goes into the upper set of holes. Now, install the upper back and tighten all the bolts. Note: all bolts used in this process are 5/16" x 3 1/4" hex bolts unless otherwise specified.

2. Lower Front (Dobby/Modular)

Locate the lower front #7. This part has rods and blocks on the inside edge and nut access holes on the bottom face. If you ordered a short seat with your loom locate the seat support #15. The seat support is a fairly short piece with one end coming almost to a point. Attach the seat support, (with the nut access hole toward the right side of the loom) to the lower front, using a 3/8" x 3 1/4" hex bolt, washer and square nut. If your loom has a full length seat you will not have a seat support. From the outside of the loom, insert the 4 - 5/16" x 3 1/4" hex bolts halfway into the holes in the side frame where the lower front will be attached. Now kindly ask your helper to prop up the front of the loom so that you can bolt the lower front to the side frames. After this is done, gently let the loom down again.

Your loom should now look like the one in figure 4. Check to see that it does.



SIDE FRAMES, REAR & FRONT OF LOOM

FIG. 4

3. Treadle Pulley Support (Dobby Only)

Locate the treadle pulley assembly #12. Orient it so that the beveled edge is on the front piece and facing down. Insert bolts with washers through the corresponding holes in the vertical support assembly 9R and 9L and tighten the nuts.

4. Treadle Pulley Bar (Modular Only)

Locate the treadle pulley bar assembly. Orient it so that the 14 pulleys are offset to the top and facing toward the front of the loom. Install the treadle pulley bar between the upright vertical supports and fasten it to the lower sides (#4) with two 5/16" x 3 1/4" hex bolts. Screw the bolts into the threaded inserts found in the lower sides. (See figure 2)

5. Spring Lever Assembly (Dobby/Modular)

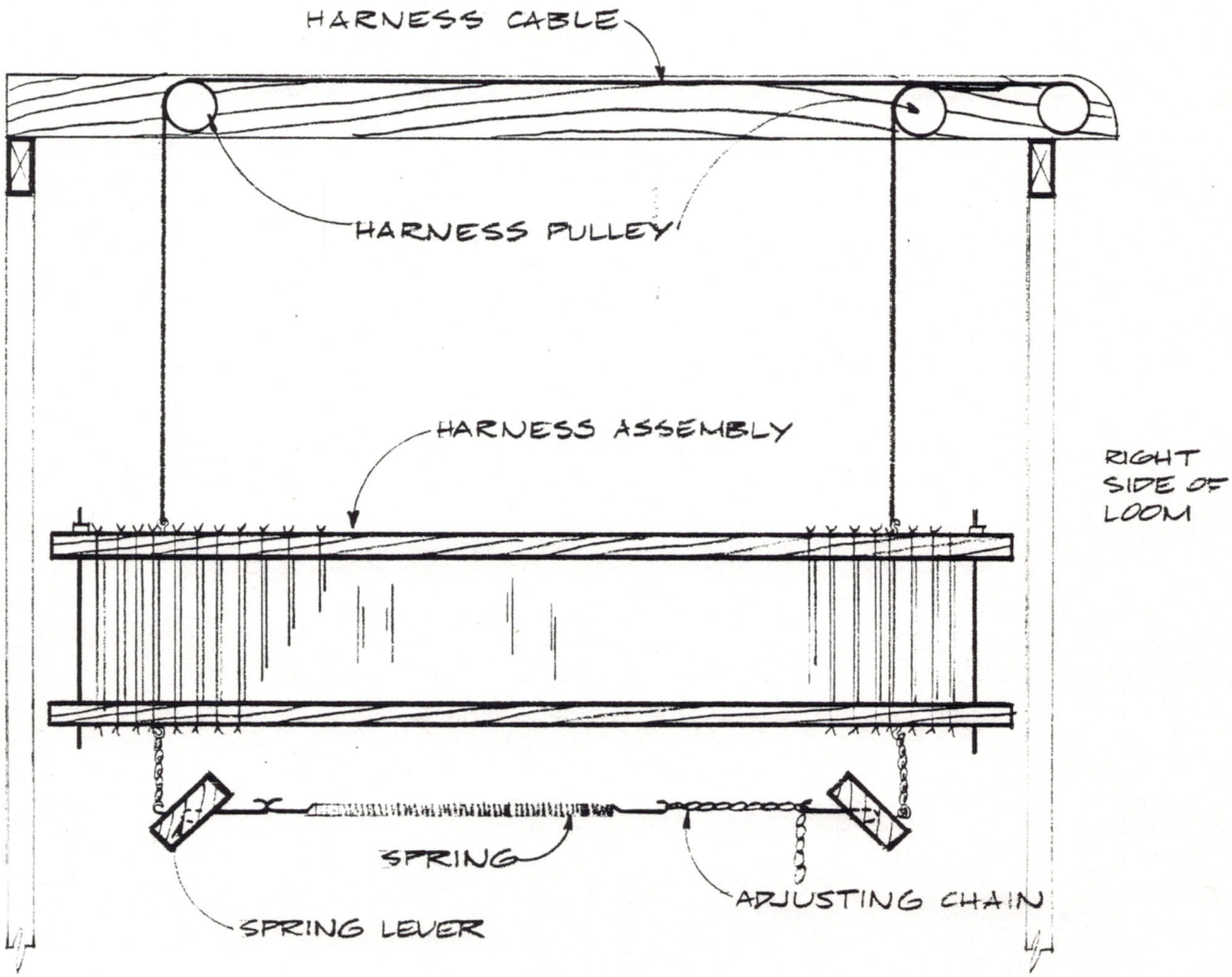
Locate the spring lever assembly #11. This assembly consists of two long pieces attached by rods with many short, thin rectangular 'spring levers' between. Orient this assembly so that the stamp 'bottom front' is toward the front of the loom and facing the floor. Make certain that the shorter spring levers are to the front (if you have more than 4 harnesses). Using 1/4" x 3 1/4" hex bolts, washers and square nuts, attach the spring lever assembly between the side frames, right above the treadle pulley assembly as shown in figure 1.

6. Spring Installation (Dobby/Modular)

See figure 5.

Now it's time to hook the springs to the spring levers. Locate your springs with chain attached. Starting with the rear-most spring lever, attach the spring to the lever on one side and the chain to the lever on the other side. The chain is for adjusting the harness tension, so for right now, just attach the last link to the lever and you can adjust it if need be after you get your first warp on.

Make sure that the wire levers are free to pivot on the metal pins in the spring levers, otherwise they may get bent and won't work properly.



HARNESS ASSEMBLY

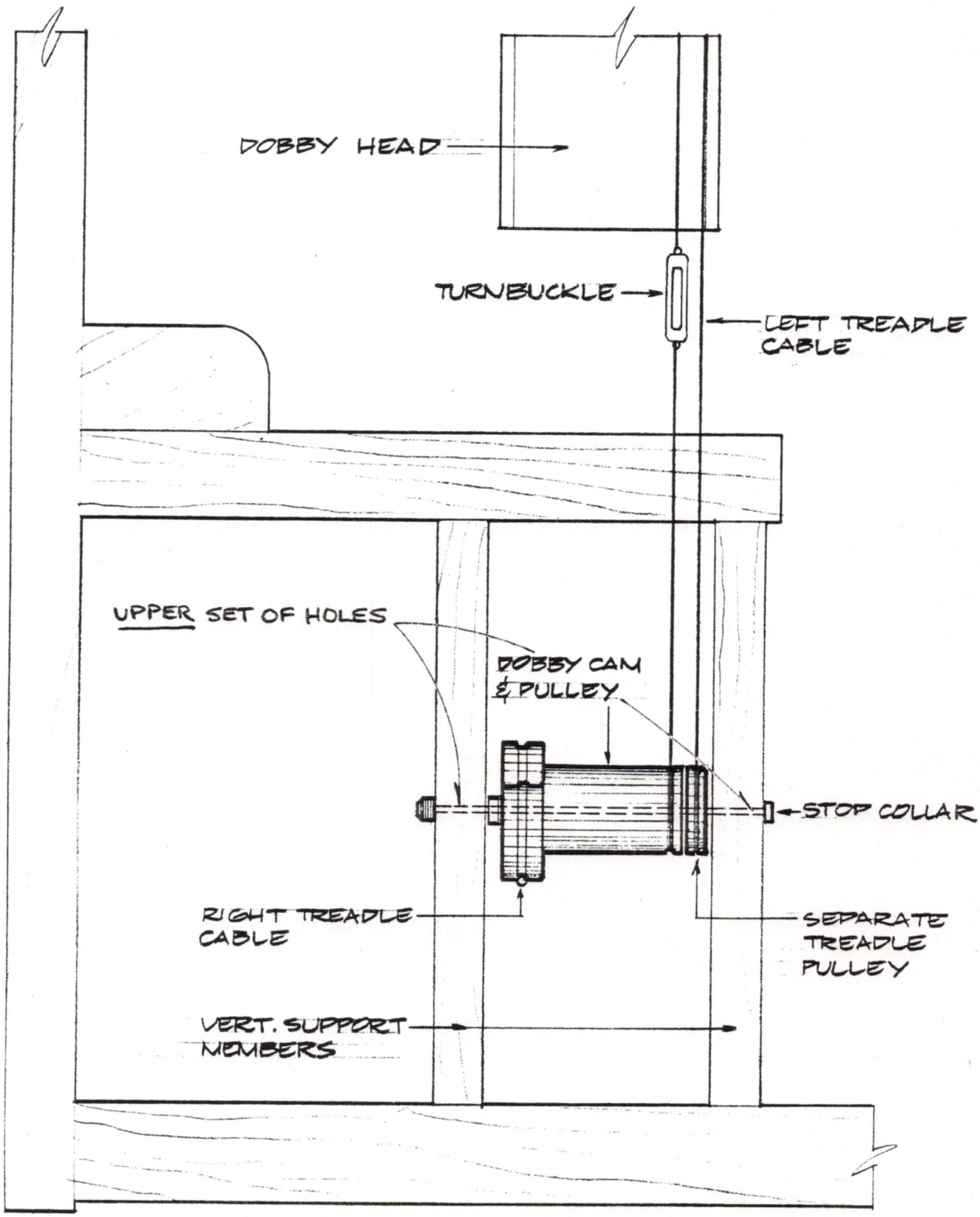
FIG. 5

7. Harness Pulley Support (Dobby/Modular)

Locate the Harness Pulley Support #10. This assembly has three rows of sixteen sheaves between two long crossmembers. Using 5/16" x 7 1/2" hex bolts, washers and hex nuts, (remember that you'll need washers under the hex bolts and the hex nuts), attach the harness pulley support assembly to the side frame as shown in figure 1. When correctly positioned, the left side will be flush with the left side of the loom and the right side will stick out a few inches beyond the right side frame pieces.

8. Dobby Cam and Pulley (Dobby Only)

Locate the Dobby Cam and Pulley Assembly (see figure 6). Orient it so that it matches the drawing. Using the allen wrench that came in the x-member hardware package, loosen the stop collar and remove it. Pull the rod out from the left and locate the upper set of holes in the right vertical support members. Slip the rod through the hole on the left (as you are looking at it while facing it), then through the dobby cam and pulley assembly and the separate treadle pulley. Now, push the rod through the hole on the right and fit the stop collar back on. Tighten it up again, using the allen wrench. See? This isn't so difficult.



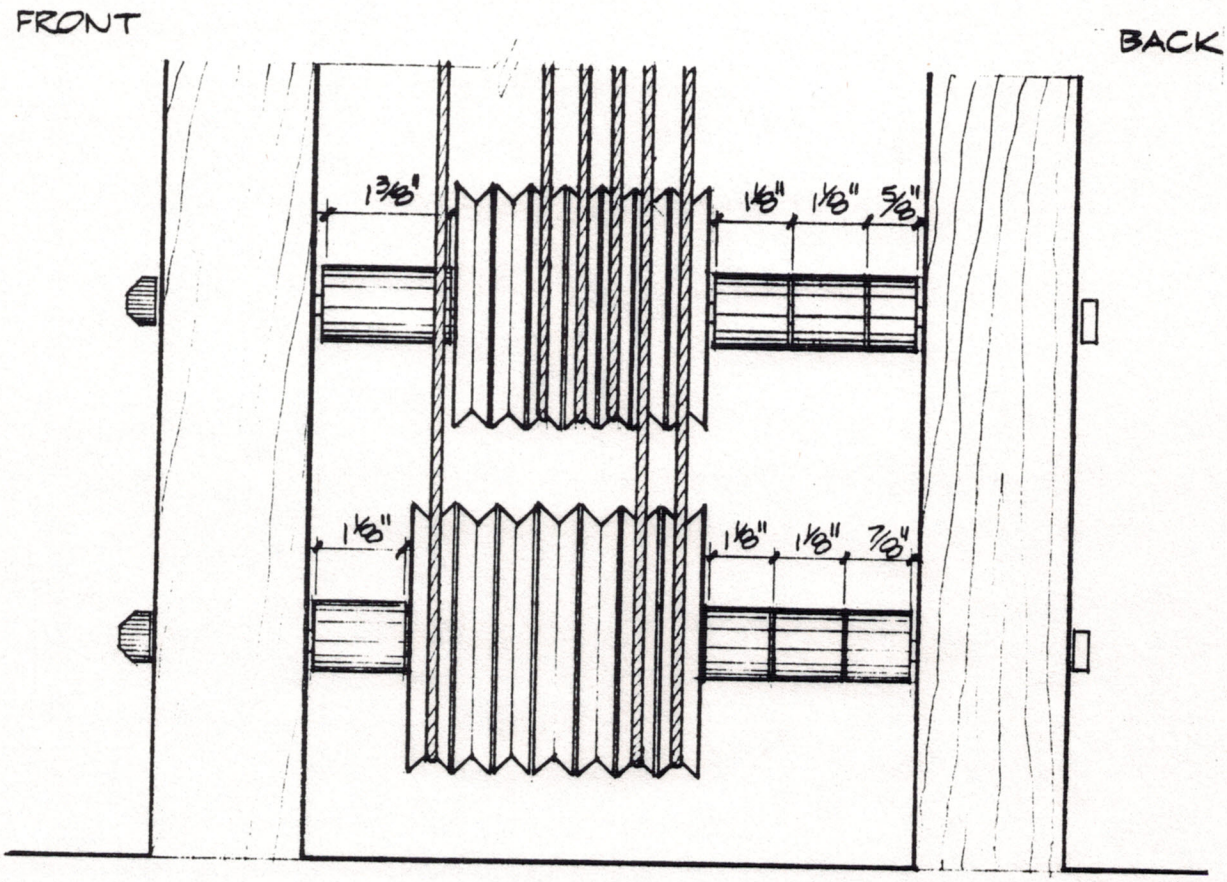
DOBBY CAM SHOWN FROM RIGHT SIDE OF LOOM

FIG. 6

9. Side Pulleys, Upper and Lower (Modular Only)

Locate the two side pulley assemblies (see figure 7). These each consist of a shaft with seven pulleys and assorted spacers held captive with a stop collar. The assembly with the smaller diameter pulleys is the Upper Side Pulley Assembly; the one with the larger diameter pulleys is the Lower Side Pulley Assembly.

These two pulley assemblies are mounted between the upright vertical supports on the right side of the loom. (See figure 2) The spacers and pulleys must go on the loom in the same relative position that they are found on the shaft. Install these assemblies by first removing the stop collars (use the allen wrench provided). Next, remove the spacers, keeping them in order, then remove the pulleys and inside spacers. Insert the Upper Side Pulley Assembly rod into the upper hole in the left (as you are facing it) vertical support. Fit the pulleys and spacers back onto the rod in the same order they arrived in. Push the rod through the hole in the right vertical support and secure the rod with the stop collar provided. Repeat this procedure with the Lower Side Pulley Assembly, inserting the rod into the lower set of holes.



MODULAR LOOM TIE-UP

SHOWN FROM RIGHT SIDE OF LOOM

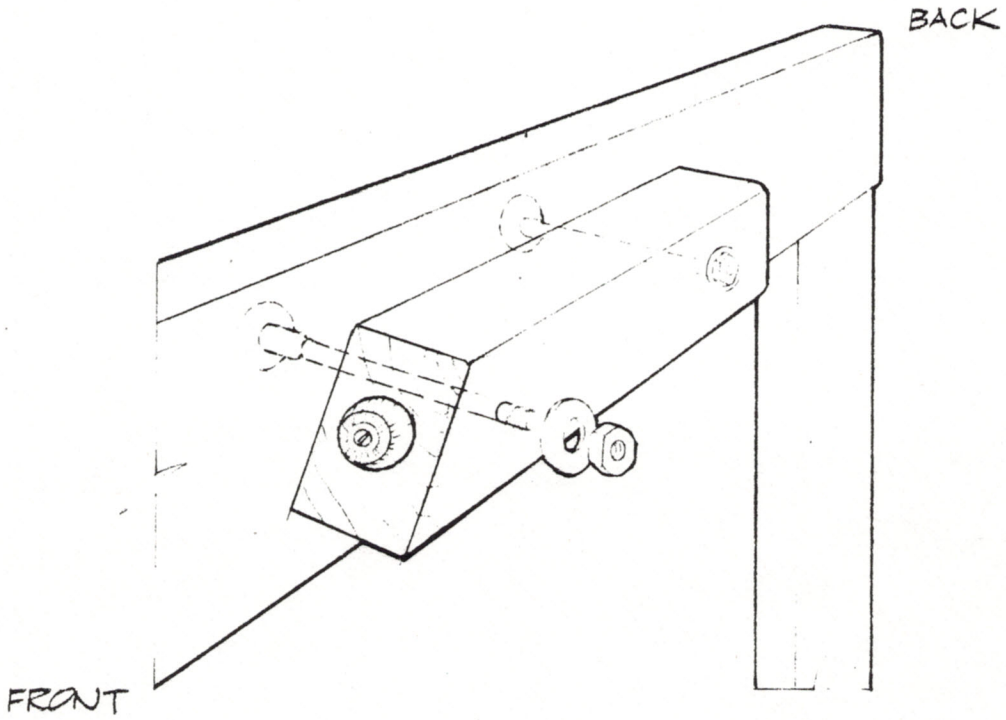
FIG. 7

10. Beater Bumpers (Dobby Only)

Locate the Beater Bumpers #40 (see figure 1). (These are shipped with the side frames.) Notice that they are labeled L and R. The stamp, of course, identifies right and left Beater Bumpers. Mount each to it's respective side of the loom, to the outside, orienting them so that the stamp is against the side frame and the bumper is toward the front of the loom. (See figure 8) Use 1/4" x 3" carriage bolts with the heads to the inside, and washers and hex nuts to the outside.

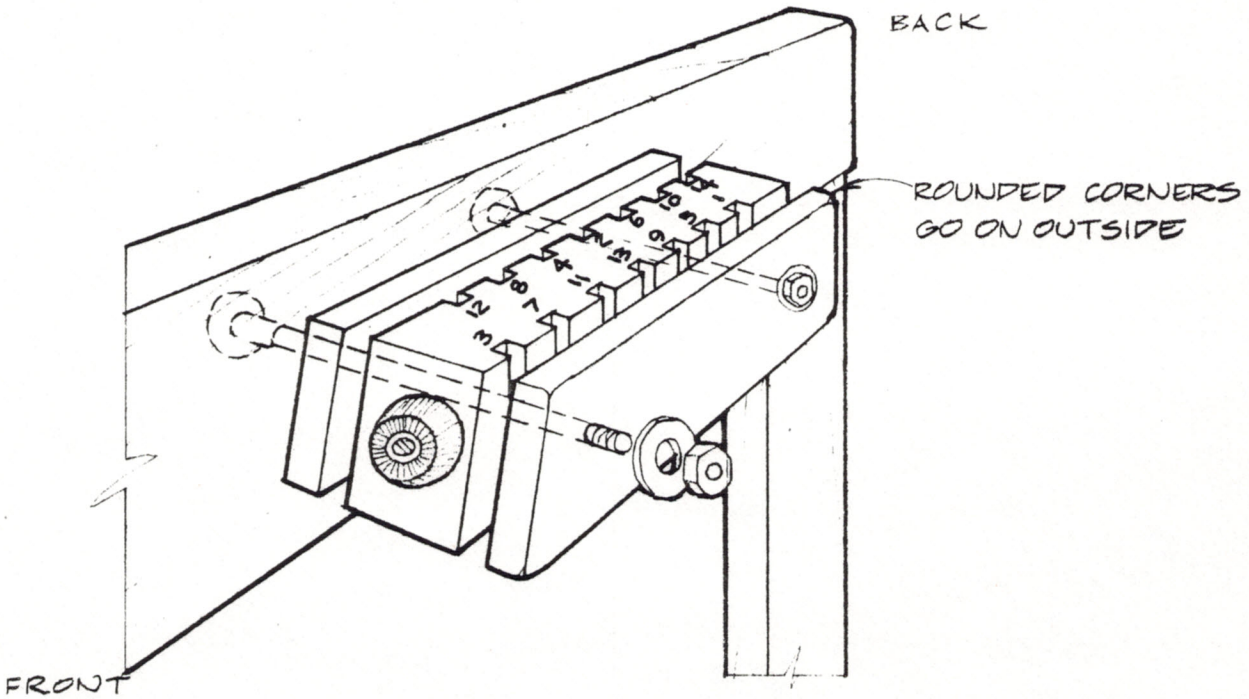
11. Beater Bumpers (Modular Only)

Locate the Beater Bumpers #40 (see figure 1). (These are shipped strapped to each side frame.) The left one has a stamp 'L' and the right one consists of three parts. They are each mounted to the outside of the Cloth Beam Supports with 1/4" x 3" carriage bolts, washers and hex nuts. Orient the left Beater Bumper so that the bumper faces the front of the loom and the stamp 'L' faces the Cloth Beam Support. Orient the right Beater Bumper so that the bumper faces the front of the loom and the stamped numbers are facing the inside so that the washers and nuts are to the outside.



BEATER BUMPER BLOCK

FIG. 8



RIGHT MODULAR BEATER
BUMPER BLOCK

FIG.9

INSTALLATION OF DOBBY HEAD (Dobby Only)

1. Mounting the Dobby

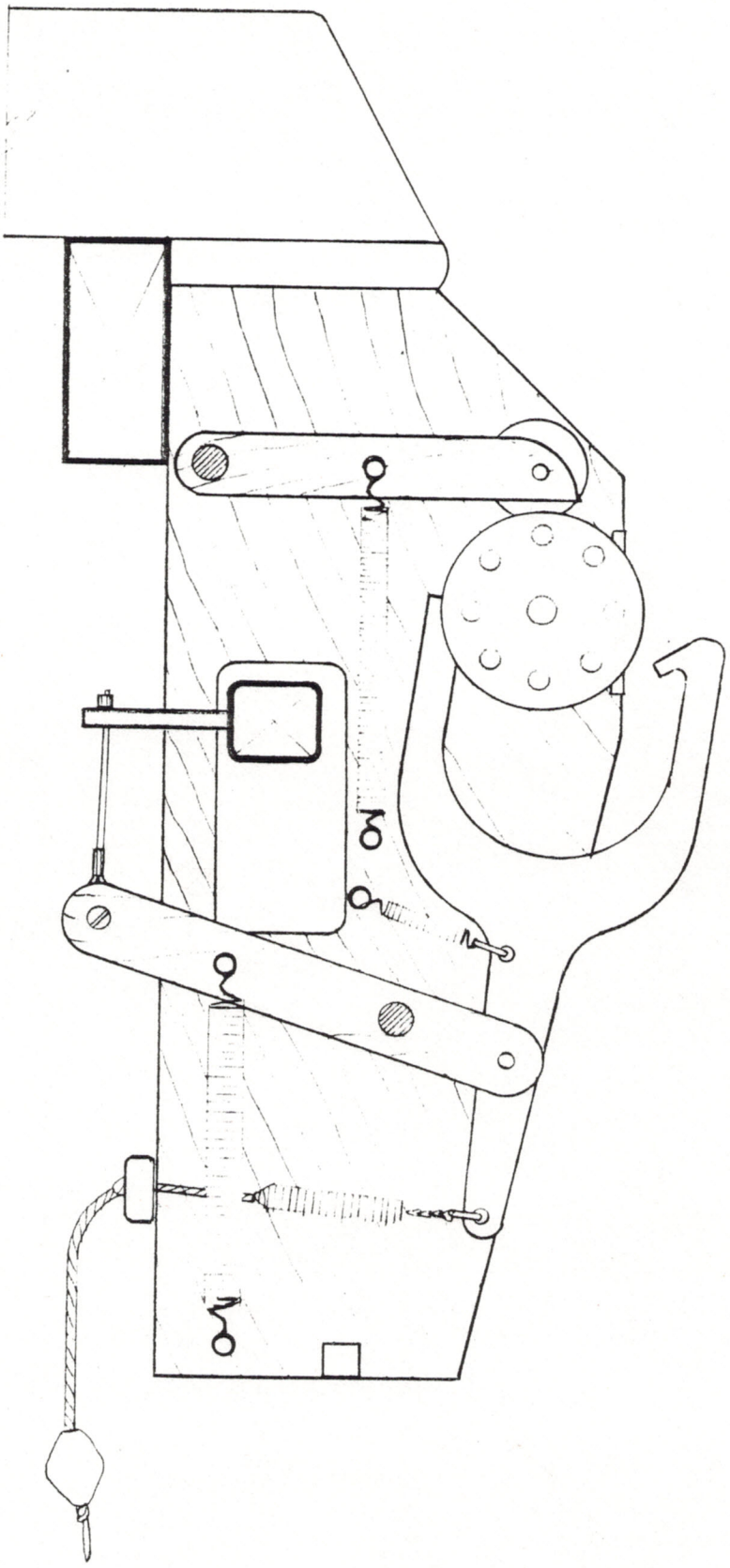
   On the back side of the Dobby Head you will find two bolts with washers and hex nuts attached. Remove these washers and nuts, making sure you don't unseat the carriage bolt heads. Check back to figure 1 to see where on the right side the Dobby is mounted. Now, lift up the Dobby Unit and insert the protruding bolts into the corresponding holes in the upper horizontal. Replace the washers and hex bolts and tighten.

2. Mounting the Dobby Arm

   Lift the Dobby Arm and support into place. (See figure 1) With the heads to the outside, using the 5/16" x 2 3/4" hex bolts provided, attach the Dobby Arm Support to the upper horizontal loosely. (We will be making an adjustment to this later.)

3. Checking the Springs

   Sometimes during shipping the springs on the Dobby Head come off their anchor pins. Check your unit against figure 10 to make sure they are all in their proper place. Good, now don't worry about all of those cables coming from within the Dobby. We'll make sense of them in the next step.



DOBBY HEAD - SIDE VIEW FROM FRONT

FIG. 10

INSTALLATION OF THE HARNESS CABLE STOP (Modular Only)

1. Locate the Harness Cable Stop #47 (see figure 2). It is a two piece part with twelve square slots in it, corresponding to the twelve possible modular harnesses. Okay. Now locate the two brass threaded inserts on the underside of the harness pulley support. Orient the Harness Cable Stop so that the countersinks are on the bottom and the rounded edges facing you. Using the 1/4" x 1 1/4" flat head machine screws, mount the Harness Cable Stop to the threaded inserts.

HARNESS TIE-UP (Dobby Only)

1. Attaching the Harness Cables

   Locate the bag labeled Harness Cables. Unwrap the separate one from the rest. Hold it up and stretch it out. You'll see that there is a clip at one end and a loop at each of the other two ends. Hold the cable up by this clip so that the two loop ends are hanging down. The shorter end will support the right side of a harness and the longer end will support the left side of the same harness.

   Look at the cables coming out of the top of the Dobby Head. Since the cable farthest to the left (closest to the front of the loom) corresponds to the first harness, and the cable farthest to the right (closest to the back of the loom) corresponds to the last, or sixteenth harness, we will refer to the cables as number 1 through number 16 from now on.

Now attach the clip you are holding to the loop at the end of cable number 1 in the Dobby Head. To spread the clip, simply press the two sides together and slip the cable loop onto one of the exposed ends. Now, work the cable loop toward the other side until it is free to move inside the clip and the clip sides are together again. Repeat this process for the remaining fifteen harness cables.

2. Cable Retainers

Mounted on top of the harness pulley supports are two wooden cross bars with felt on their undersides. Loosen these until there is about 1/4" between the felt and the pulleys.

3. Laying the Harness Cables

It is helpful, but not necessary, for this next step to stand on a sturdy bench or chair. Set the bench, or stand, between the lower front and the spring lever support. Take hold of the number 1 harness cable and route it over the pulley directly above it. Now bring that same cable (both ends) over the number 1 pulley (under the cable retainer) in the next set of pulleys. At this point all of the harness cables should be over all of the pulleys on the right side of the loom.

4. Tightening the Cable Retainers

Now tighten down the cable retainer above the right set of pulleys so that it <u>almost</u> touches the pulleys. Don't tighten the cable retainers down far enough that they impede the movement of the pulleys. It is essential to the proper functioning of the loom that they be free to move. The cable retainers only purpose is to keep the cables from jumping to a neighboring pulley.

5. Routing the Cables

Route the long ends of each of the sixteen cables over the far left set of pulleys (under the cable retainers). Now, tighten the left cable retainer as you did the right one. Very good. Now on to the next step.

HARNESS TIE-UP (Modular Only)

1. Loosening the Cable Stop

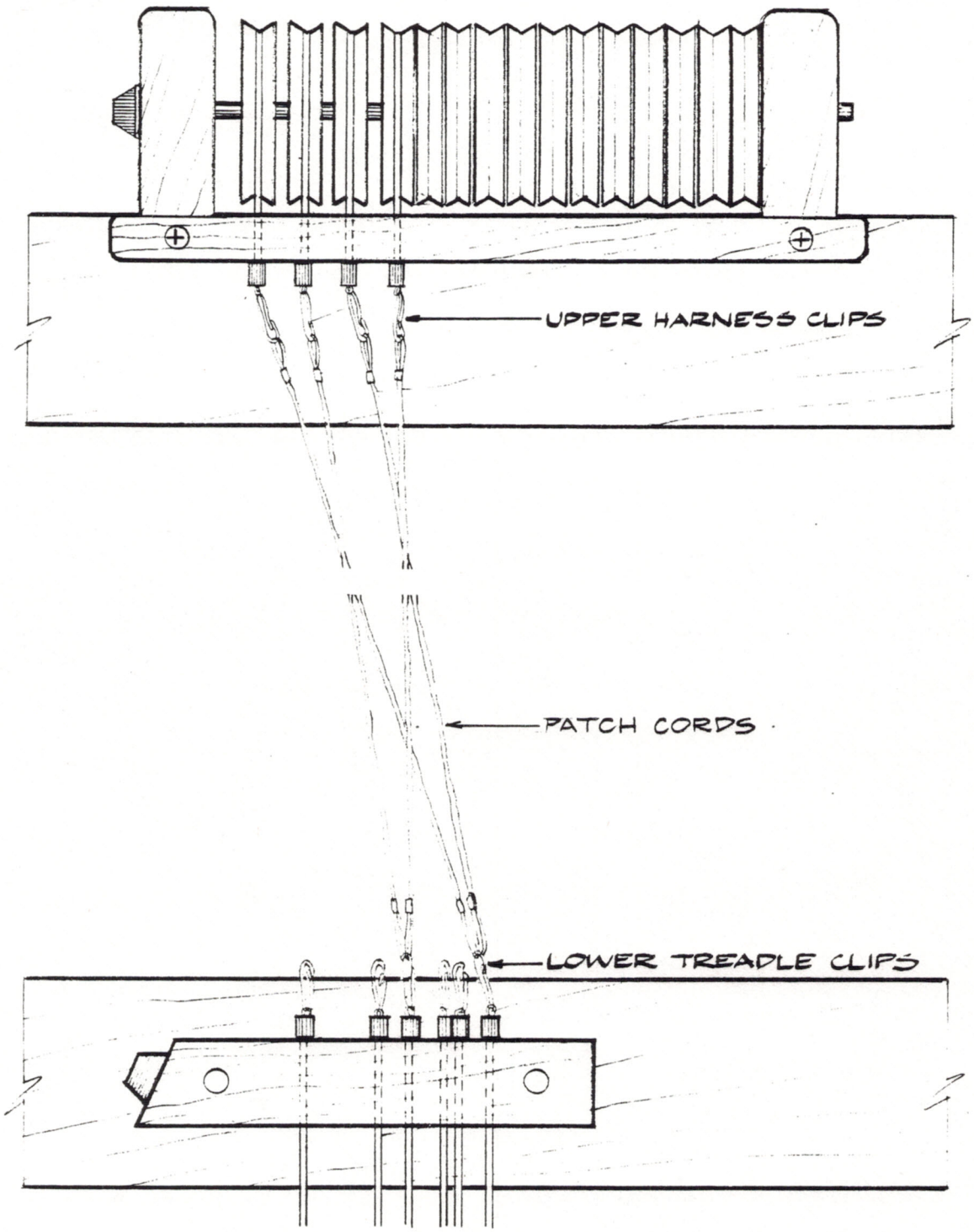
Using a screwdriver, back out the machine screws that attach the two parts of the Cable Stop, so that there is about 1/4" between the part with the slots in it and the outer piece. Now locate the bag containing the Modular Harness Cables. (Notice with glee how your pile of unassembled parts is shrinking as your loom is growing.)

2. Identifying the Harness Cables

Take the harness cables out of the bag and separate one from the rest. Holding it up by the end with the clip and rubber stop, notice that there are two other ends, each with a loop at its end. The shorter end will support the right side of a harness and the longer end will support the left side of that same harness.

3. Installing the Cables

Bring the two looped ends up through the space between the two parts of the cable stop and into the groove at the left side. (The side closest to the front of the loom.) (See figure 11) Repeat for the next cable, inserting it into the groove directly to the right of the one you just did. Repeat for the rest of the cables. (If there are any empty grooves - i.e., you ordered less than twelve harnesses - they should be at the right side of the cable stop.)



MODULAR LOOM TIE-UP FIG. 11

4. Tightening the Cable Stop

Now slowly tighten the machine screws holding the two pieces of the cable stop together, captivating the cables. You'll probably need to work with them a little bit to persuade them to stay in their respective slots. Have some patience, sing a little song, and when they are all in their slots tighten down the screws. (The clips and rubber stops should be facing down.) It is important that they are all the way seated and are free to move up and down so try each one and when you're sure things are as they should be, go to the next step.

It is helpful but not necessary, for this next step, to stand on a sturdy bench or chair. Set the bench, or stand, between the lower front and the spring lever support.

5. Cable Retainers

Mounted on top of the harness pulley supports are two wooden crossbars with felt on their undersides. Loosen these until there is about 1/4" between the felt and the pulleys.

6. Laying the Harness Cables

Take hold of the harness cable closest to the front of the loom. (This is the cable for harness number 1, and from now on will be referred to as cable number 1. The cable next to it will be referred to as cable number 2 and so on.)

Lay both ends over the pulley directly above cable number 1. Now bring both ends of the same cable over the 1st pulley (and under the cable retainer) of the next set of pulleys. Repeat these two steps for the remaining cables. At this point all of the harness cables should be over all of the pulleys on the right side of the loom.

7. Tightening the Cable Retainers

Tighten down the cable retainer above the right set of pulleys so that it <u>almost</u> touches the pulleys. Don't tighten the cable retainers down far enough that they impede the movement of the pulleys. It is essential to the proper functioning of the loom that they be free to move. The cable retainers only purpose is to keep the cables from jumping to a neighboring pulley.

8. Routing the Cables

Route the long ends of each of the cables over the far left set of pulleys (and under the cable retainers). Now tighten the left cable retainer as you did the right one.

HARNESS ASSEMBLY (Dobby/Modular)

1. Locating and Identifying the Harness

   Locate your harness sticks. They are long, thin pieces of wood with eyelets on either end. There should be two groups. One group is labeled 'Tops'. The other group is separated into separate bundles of four harness sticks each (unless yours is a Modular loom with only four harnesses, in which case there will be one group of four tops and one group of four 'bottoms'). Each of the bundles of four bottom harness sticks is labeled with a '1', '2', '3', or '4'. Leave the tape and number stamp on these until they are needed.

2. Preparing for Harness Assembly

   You'll need a table top for this next step. What you are going to do is assemble the harnesses so that you can hang them on the cables.

   Untape the bundle of harness sticks labeled 'Tops'. Lay one of these on the table, about a foot and a half in from the edge, with the eyelets facing away from you.

3. Understanding your Heddles

Now locate the bag of heddles. Open it and look at your heddles, but don't, I repeat DON'T remove the twist ties yet. Now locate your harness wires. (Those are the long wires with copper stops near one end.) Pick up a bundle of heddles, (there are approximately 100 heddles in each bundle) and hold them up by one end, allowing the other end to hang freely. Notice that there are four twist ties, two above the eye of the heddle and two below the eye. Now, with the thumb and index finger of your right hand, take hold of the upper right twist tie. Grasp the upper left twist tie likewise with your left hand. Gently pull apart and notice that all of the strings are captivated in either the right or left twist tie. If you had four hands you could grasp the bottom two twist ties in the same manner. Then you would realize that there is indeed some order and reason to this twist tie business. Into the space that is created by pulling apart the twist ties, you will later insert a harness. Now that you understand twist ties you can see that if they were to be removed at this point you would experience chaos.

4. Harness Assembly (Polyester Heddles)

With one group of heddles in hand, return to the table with the harness stick laying on it. Now, insert the harness stick into the space that was created by pulling apart the twist ties. At this point you should have an assembly made up of one harness stick, with eyelets facing away from you, and one bundle of heddles, still possessing four twist ties. Around the end of the harness should be the heddles. The heddles should be oriented so that the eyes of the heddles are between you and the harness stick. Notice that there is another "space" (between the twist ties) that should be lying between the eyes of the heddles and you, that will accommodate another harness stick. Okay, now untape the bundle of four harness sticks with the highest number. (If you have a Dobby Loom, this will be #4, if you have a Modular Loom it will be 1, 2, or 3 depending on the number of harnesses ordered.) Take one of these harnesses to the table, and with the eyelets facing you, insert the end of the harness into the "space" in the heddles.

There are sixteen bundles of heddles shipped with the 48" dobby loom. A 60" dobby loom has 20 bundles which need to be distributed among sixteen harnesses. Therefore each harness will be fit with 1 1/4 bundles of heddles. The easiest way to do this is to follow the directions for putting one full bundle on each harness. Split the remaining four bundles into four groups each, making sure to secure each new bundle in the way they were when shipped. (See figure 12 for information as to where to cut the heddles.) Now slip the new smaller bundles on the harness sticks as described above.

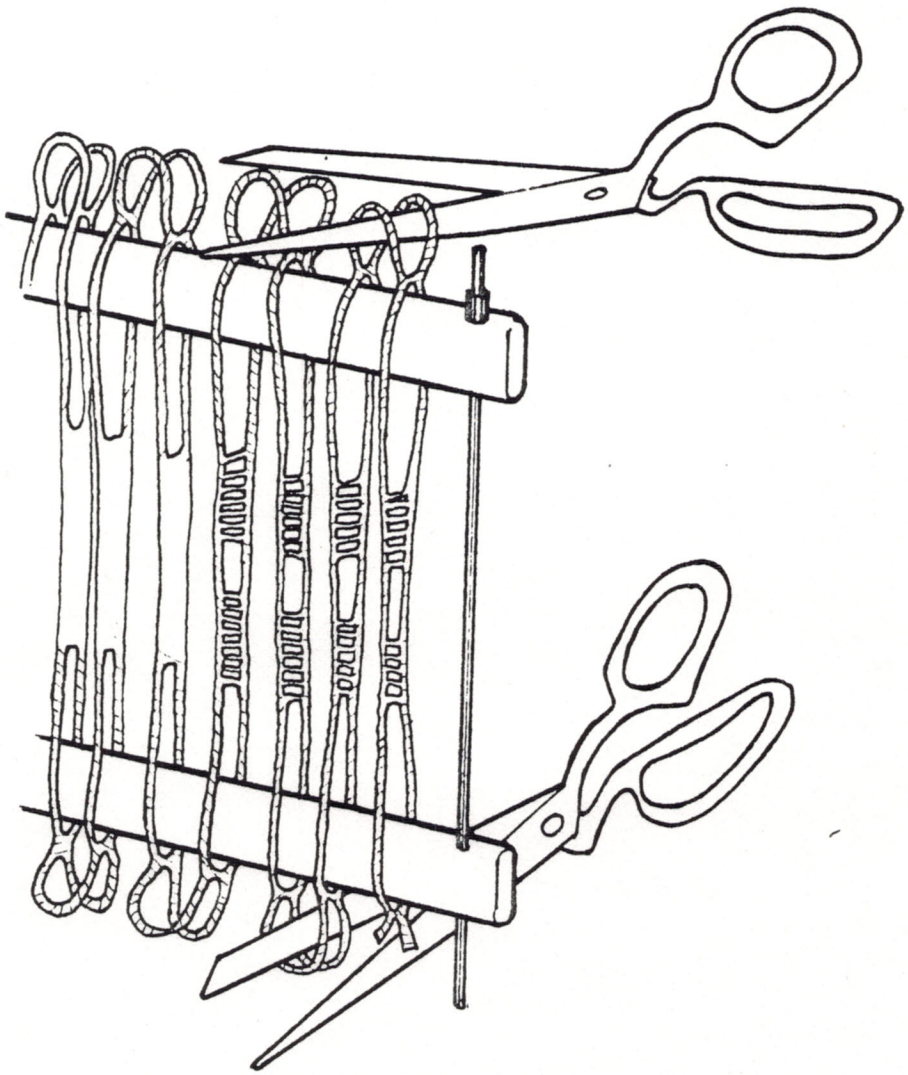
Now pick up one of the harness wires and notice that there is a copper stop near one end of it. That end is the top. Insert the bottom end of the harness wire into the hole

located at the end of the "top" harness stick and down through the hole in the bottom harness stick. Repeat this for the holes on the other end of the upper and lower harness sticks.

Included in the contents of your hardware bag is a small bag of 32 black 'O' rings. You can now slip one 'O' ring on the bottom of each harness wire and bring each to within 1/8" of the bottom harness sticks. These serve to prevent the harness wires from jumping out of the harnesses.

When you are certain you've done this correctly you can untie the twist ties. Now, if you will spread the heddles out along the lengths of the harness sticks, you will notice that the heddles are all attached to one another at the top or bottom. These connecting loops can be cut to make threading easier. This will neither weaken nor unravel the heddles. (See figure 12)

(Another hint to make threading easier-while you have your heddles spread out between two harnesses, mark above the eye of each one with a colored pen. For instance you may use four colors of pen and mark the eyes on the heddles of harness #16 with purple, the eyes of harness #15 with red, the eyes of harness #14 with blue and the eyes of harness #13 with orange. Harness #12's code color will be purple, harness #11's code color red and so on. This makes it easier to tell which heddle belongs to which harness and lessens the chance of threading errors.) Now pick up your single harness assembly by the top harness (the one farthest away from you on the table). Bring it over to your loom and hook up your last harness cables (the ones closest to the back of the loom) to the eyelets in the harness stick. There, you've completed one harness, now the rest should be easy!



CUTTING THE HEDDLES APART

FIG 12

Repeat the steps above for each harness assembly. Always have the "top" harness stick be the one furthest away from you with the eyelets facing away.

Remember to keep the bottom harness sticks in order. The one's go toward the front of the loom, followed by two's, three's, and finally the four's closest to the back of the loom.

Included in the contents of your hardware bag is a small bag of 32 black 'O' rings. You can now slip one 'O' ring on the bottom of each harness wire and bring each to within 1/8" of the bottom harness sticks. These serve to prevent the harness wires from jumping out of the harnesses, which would normally only happen during extremely fast treadling.

5. Attaching the Spring Lever Chain

Now that you have assembled and hung all of your harness sticks, you can hook them up to the Spring Lever Chain. Near the outside end of each spring lever is a chain. Take the end link of your last spring lever on the left side and hook it to the left eyelet on the underside of the last harness stick. Repeat for the right side. Now hook up all of the harnesses in the same fashion.

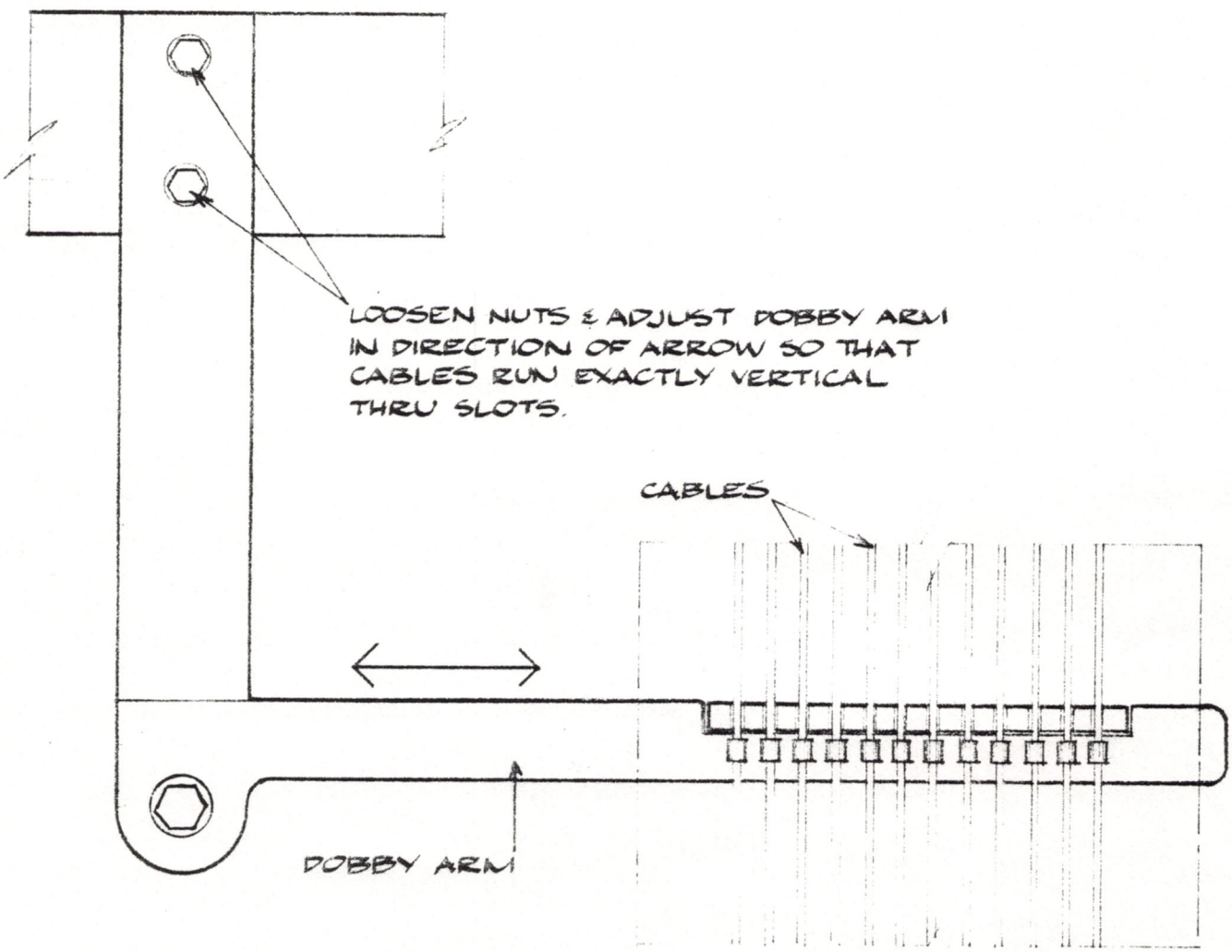
6. Realigning the Dobby Cables (Dobby Only)

Your Dobby Head has been thoroughly tested at the AVL Factory. At that time, all of the cables were in their proper positions for use. Frequently during shipping, however, the cables get jostled out of position and must be straightened out. Now's the time to do that. If you look up at your Dobby from underneath, you will notice that there are sixteen "fingers", each with a slot in the back side of it. There are also sixteen cables. There should be one cable in each slot. If there isn't, carefully rearrange them so that the first cable is inside the first finger slot, etc.

ALIGNING THE DOBBY ARM (Dobby Only)

Now that there is some tension on the harness cables, the Dobby Arm can be aligned with the Dobby Cables. (See figure 13)

Loosen the two bolts that attach the Dobby Arm to the top right horizontal just enough so that the Dobby Arm can be shifted back and forth slightly by tapping on it with the side of your fist. Lift the right end of the Dobby Arm up so that it touches the rubber bumper in the top of the slot in the right side of the Dobby Head. Now look inside your Dobby Head so that you can see the Dobby Arm



DOBBY ARM ALIGNMENT

FIG. 13

straight on. Notice that attached to the Dobby Arm is a black metal piece with sixteen slots cut into it. What you have to do here is align the Dobby Arm so that the slots line up exactly with the Dobby cables. The Dobby won't work properly unless this alignment is absolutely perfect so position yourself directly in front of cable number 1. Now, while continuing to hold the Dobby Arm up against the bumper with your right hand, tap the other end of the Dobby Arm with your left hand and sight down the number 1 cable and slot until perfect alignment is achieved.

Now retighten the Dobby Arm attaching bolts. Check to see that the alignment is still perfect. Move the Dobby Arm up and down in the slot to be certain it doesn't bind. If it does, you'll need to loosen the two bolts again, put a paper shim in between the Dobby Arm support and the top right horizontal, realign the Dobby Arm with the cables and tighten down the bolts. If, after you've tightened the bolts, the alignment is perfect and the Dobby Arm doesn't rub or bind on the sides of the slots in the Dobby Box, then tighten the nuts down tight enough so that you're certain they won't slip.

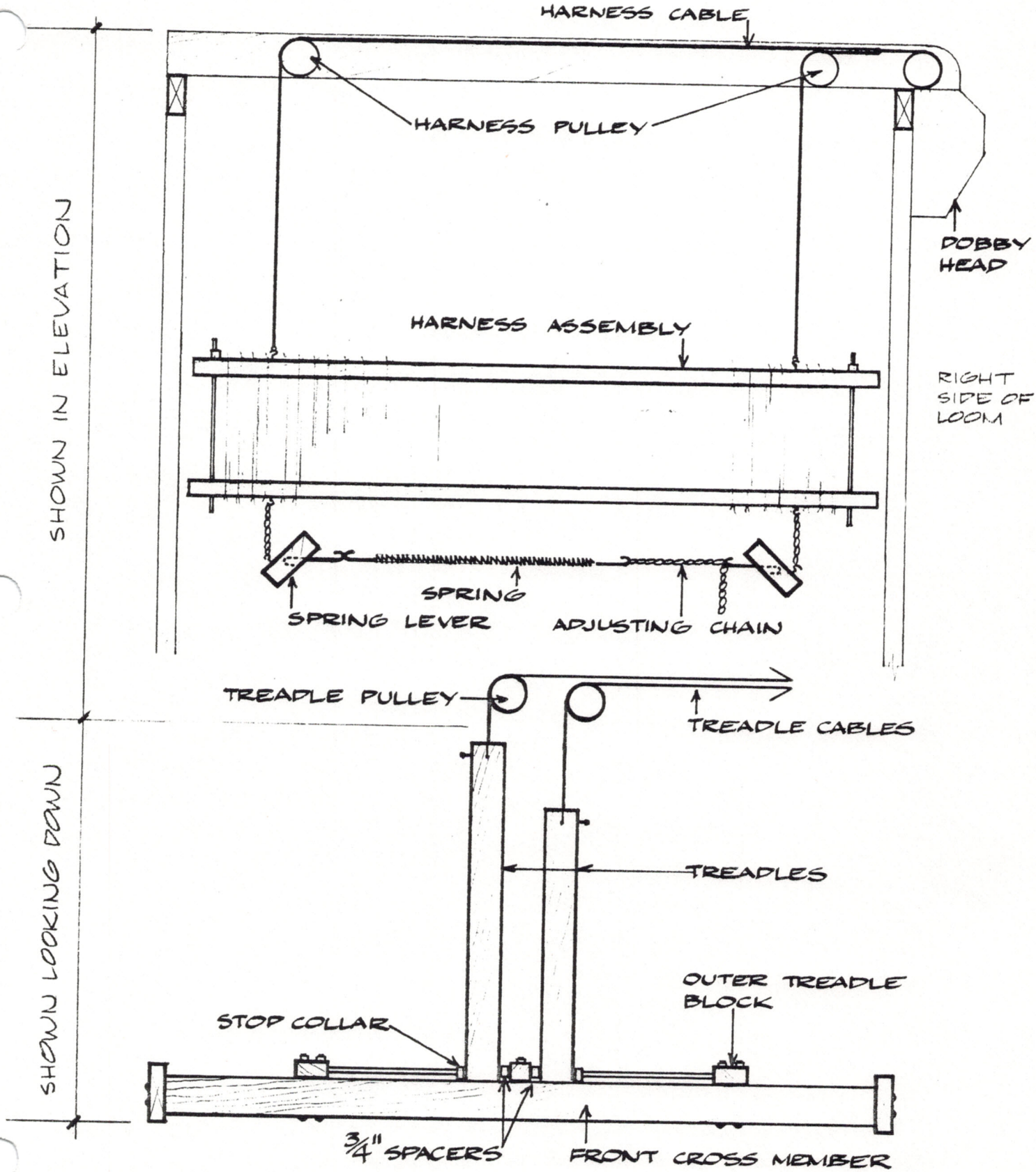
TREADLES AND TREADLE TIE-UP (Dobby Only)

1. Removing Rods and Blocks

   Look at your Lower Front Piece and notice that, mounted to the inside, are three wooden mounting blocks, two 3/8" rods, two round wooden spaces and two stop collars. Remove all three blocks and separate them from the rods. (Notice that on all three blocks the "rod hole" is off-set, slightly, away from the lower front. Remember to reassemble them the same way.) Now loosen the collars, with an allen wrench. Remove the round wooden spaces.

2. Installation of Treadles (See Figure 14)

   Locate your treadles. There are two treadles, one shorter than the other. Kneeling over the lower front, orient them so that the longer one is on the left and the pins are facing away from each other.



DOBBY TREADLE ASSEMBLY

FIG. 14

Now pick up the rod that you took out of the left side of the lower front. Slip the rod through the horizontal hole at the end of the left treadle, making sure the stop collar is to the outside of the treadle. Insert the left end of the same rod into the rod hole in the far left mounting block. Slip the round wooden spacer back on the rod, to the right of the treadle. Okay, now repeat the steps above for the right side. Slip the right rod through the hole in the right treadle, making sure the stop collar is to the outside of the treadle. Insert the right end of the rod into the far right mounting block and slip the spacer back on, to the left of the treadle. Now insert the inside ends of both rods into the rod holes in the center mounting block and re-mount all three blocks to the lower front. The order of parts in the assembly now should be as follows (from left to right): left mounting block, rod with stop collar, left treadle (the long one), spacer, center mounting block, spacer, right treadle, stop collar and rod, and finally the right mounting block.

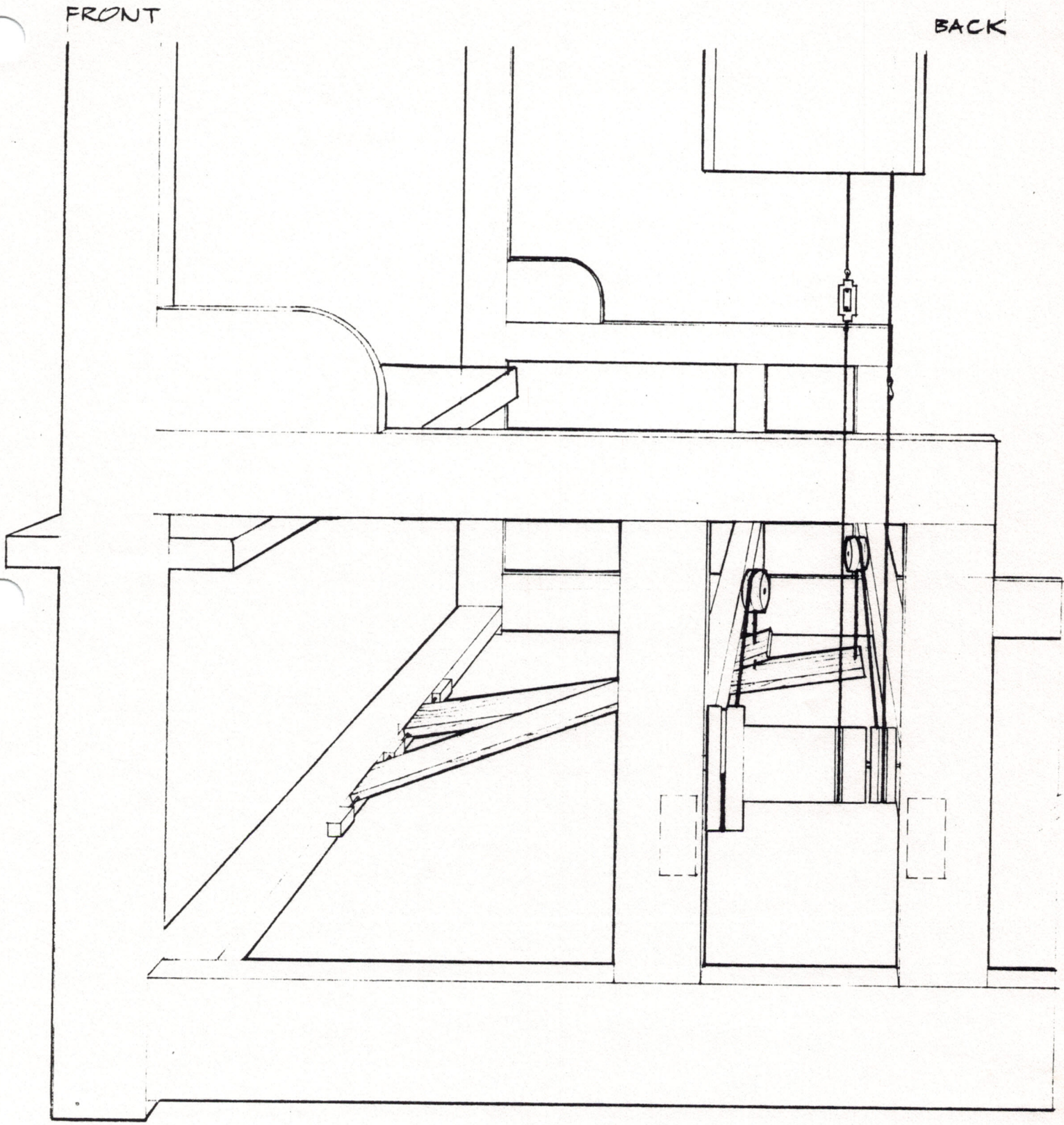
Now bring your stop collars up to within 1/8" from each treadle and tighten them down. (There is indeed a reason for all the excess rod. This loom, if it were in its "Modular" mode, could accommodate up to fourteen treadles.)

Check your treadle assembly with figure 14 to be certain you've done it correctly. Okay, now let's tackle the tie-up.

3. Treadle Tie-Up

A. Left Treadle

There are two cables coming out of the bottom of the Dobby Head. Take the longest one and run it down to and under the groove of the pulley nearest to the rear of the loom in the Dobby Cam and Pulley Assembly (see figure 15). Now climb right inside the loom, and continue by routing the cable over and down the far left treadle pulley in the "Treadle Pulley Assembly". Notice the pin to the outside of the left treadle. Using your pliers, pull the pin far enough out of the hole so that you can insert the loop at the end of the treadle cable around the pin inside of the access hole. Do this, then push the pin back into its hole so that it fits snugly and won't come out while weaving. With the treadle hanging, the cable should be coming straight up from the pin, and over the left side of the left pulley.



DOBBY / CAM / TREADLE TIE-UP

FIG. 15

B. Right Treadle

Now let's handle the right treadle. Look at the Dobby Cam and Pulley Assembly and you'll see another cable wound around and taped to the groove in the cam pulley (nearest to the front of the loom). Untape and partially unwind the cable around the pulley. Run the cable over the top of the pulley directly above the right treadle and down to meet the treadle. Pull the pin out beyond the access hole as you did for the left treadle and secure the cable to the treadle by holding the loop in line with the pin (inside the access hole) and passing the pin through the loop and on into the pin hole at the far side of the access hole. Now secure the pin into the wood, as you did for the left treadle.

C. Cable with Turnbuckle - (See Figure 6)

Look at your Dobby Head and notice that there's one more cable coming out of the bottom of it. Notice also that there's an eyebolt on the bottom end of the cable with a metal turnbuckle attached to it. Okay, now turn your attention back to the Dobby Cam and Pulley Assembly. There is, wound around the middle groove in the assembly, a cable with an eyebolt on the end of it taped down. Untape this cable and rotate the Dobby Cam Assembly by hand in a clockwise direction (as you are looking at it from the rear of the loom). This will cause the short treadle cable to wind-up on it's pulley and raise the right treadle. Keep rotating the pulley until the treadle comes all the way up and stops against the treadle pulley. This has also probably caused the cable that you have just untaped to get wound up on the Dobby Cam Assembly. If it has, unwind the cable while you hold onto the Dobby Cam, making sure that the right treadle stays up against the treadle pulley.

Now take hold of the end of the eyebolt and pull it up toward the Dobby Head. If you've done the assembly correctly you should be able to make the treadle go up and down by pulling the eyebolt on the cable up and letting it down.

Good, now take the turnbuckle completely off the Dobby cable and then restart it again but just enough to get it started (not more than two turns). Now pull up the cable that makes the treadle go up and down and screw the turnbuckle to the eyebolt (this is a reverse thread so turn the turnbuckle in the same direction you did to start it onto the Dobby cable eyebolt). That's it except for the final adjustment.

D. Adjusting the Turnbuckle

The purpose of the turnbuckle is that it provides a way to adjust treadle travel so that you get a full shed.

In order to get the proper adjustment you'll need to tighten or loosen the turnbuckle until, when the left treadle is pushed all the way down, the Dobby arm raises and touches the upper bumper in the Dobby Box side. At this point the short treadle should stop about 1/2" below its cable pulley. When adjusted properly, the right treadle should stop approximately 1" from the floor on its down swing, and 1/2" from the cable pulley on its upswing.

TREADLES AND TREADLE TIE-UP (Modular Only)

1. Removing Rods and Blocks

Look at your Lower Front and notice that, mounted to the inside, are three wooden mounting blocks, two 3/8" rods, some round wooden spacers, and two stop collars. Remove all three blocks and separate them from the rods. (Notice that on all three blocks the "rod hole" is off-set slightly, away from the lower front. Remember to reassemble them the same way.) Now loosen the stop collars with an allen wrench and remove them. Remove the round wooden spacers.

2. Identification of Treadles

First locate your treadles. (See Figure 16) Pick up one and hold it so that the pin sticking out the end is away from you and the long flat side is toward the ground. The angled part should be facing up. Now notice the largish hole that runs horizontally through the rounded end of the treadle. That's where the rod goes through and fastens it to the lower front. Pull the pin with the black cap out halfway. The end loop on the treadle cable goes around that pin.

MODULAR TREADLE

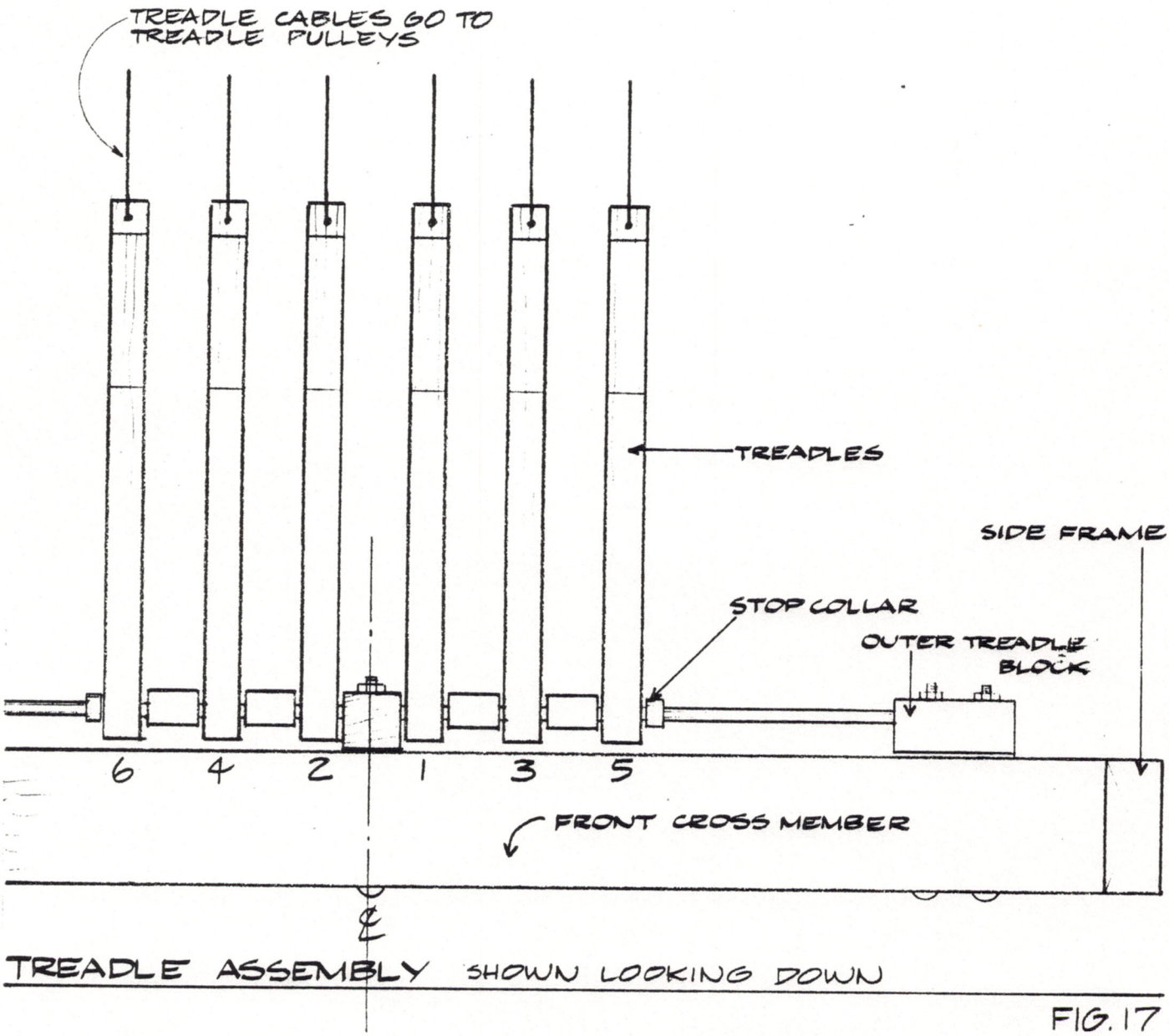
FIG.16

FIG.16

3. Installation of Treadles - (See Figure 17)

Set half of your treadles on the left side of your lower front and half on the right side. Orient them so that their pins are away from you and the long flat side is toward the ground (as you did in step #2 above). First pick up the rod that you removed from the left side of the Lower Front. Insert the right end of the rod into the "rod hole" in the center mounting block. Now, insert the left end of the rod hole in one treadle. Follow that with a round wooden spacer. Repeat until you've used up all the treadles in your left pile.

Now insert the right rod into the right "rod hole" in the center mounting block. From the far right side, slip a treadle onto the rod, followed by a spacer. Repeat this until all of the treadles in your right pile are gone. Now, if you've ordered fewer than the full set of treadles (14) you can slip a stop collar to the outside of each outside treadle and tighten it about 1/8" away from the treadle. If you've ordered the full set, you won't have room for the stop collars so you can put them aside. Now slip the left end of the left rod into the left mounting block and likewise for the right side. At this point make sure that the "rod holes" on all three of these blocks are offset away from the lower front, as these holes are not centered on the blocks. Remount the blocks to the Lower Front and tighten down the nuts.



TREADLE ASSEMBLY SHOWN LOOKING DOWN

FIG. 17

4. Locating Treadle Cables

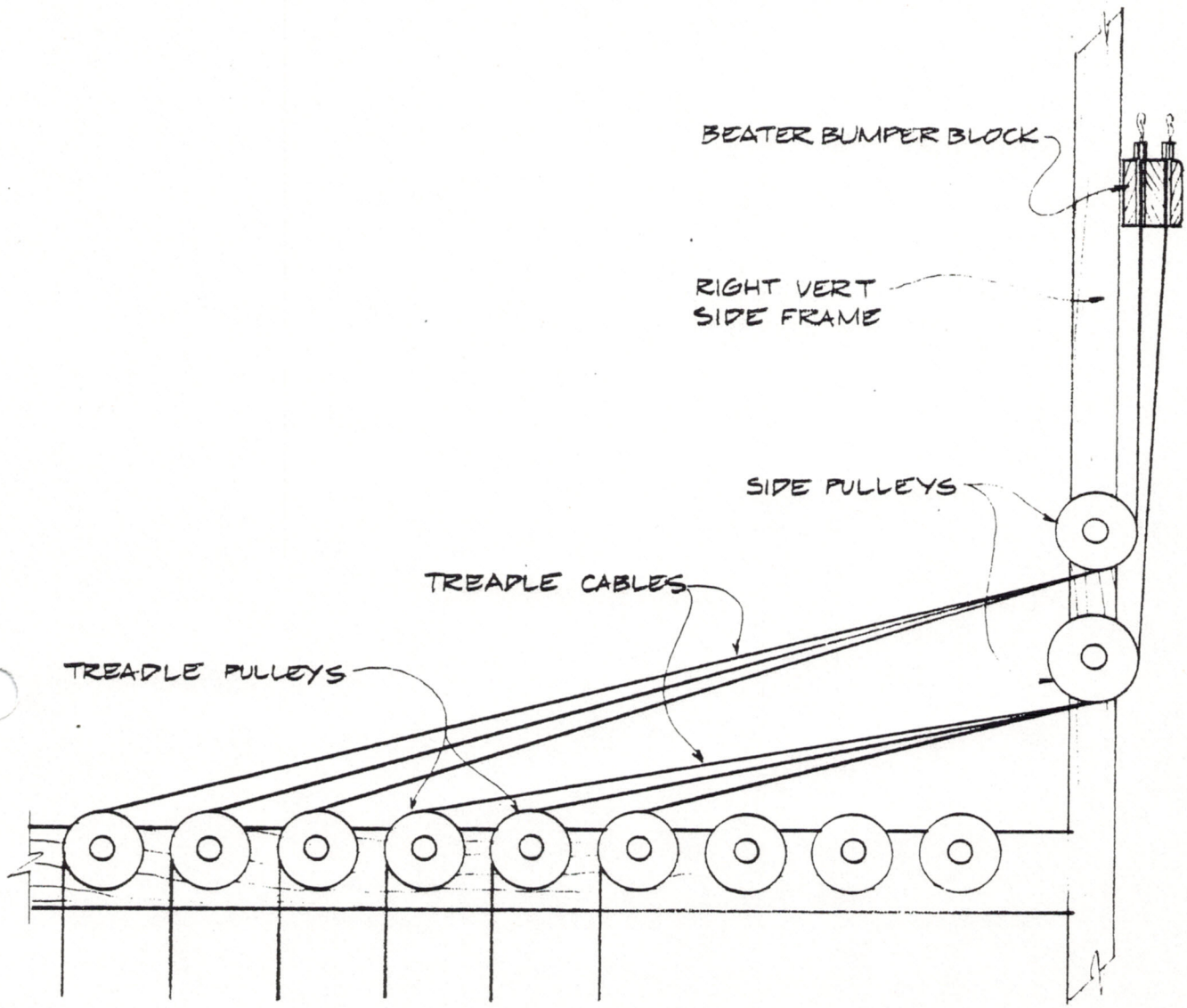
Locate your Treadle Cables. Each one is labeled with a number corresponding to a number in the beater bumper block and the treadle numbers. (See figure 17 for treadle numbers.)

5. Installing the Even Numbered Cables

The treadle cables are shipped in two bunches, even numbered and odd numbered. Locate the even numbered cables. Open the right Beater Bumper Block and install the even numbered cables in their correspondingly numbered slots with the snap and rubber impact collar above the block. The cable numbers are located on the cable near the looped end. When all the even cables are in their proper holes, seat the Beater Bumper Block, making sure no cables are pinched and temporarily secure it with the nuts. You should now have all even numbered cables hanging from the Beater Bumper Block. The treadles are numbered, as shown in figure 17 with the odd numbers to the right of the center block and the evens to the left. The easiest way to string the treadle cables is to start with the left most treadle. Each of these even numbered Treadle Cables will be routed under the corresponding pulley in the upper side pulley assembly, (see figure 18), through the loom, over the corresponding pulley of the Treadle Pulley Bar and straight down the left side of the pulley to meet the pin of the treadle. Pull out the pin with the black cap on it, capture the loop on the end of the cable inside the large access hole and push the pin pack in securely. Note that the seven even numbered holes in the Beater Bumper Block correspond, in order, to the seven pulleys of the upper side pulley assembly, as do the seven odd numbered holes to the seven pulleys of the Lower Side Pulley Assembly.

6. Installing the Odd Numbered Cables

Once the even numbered cables are connected, the odd numbered cables are installed in the front corresponding row of holes in the Beater Bumper Block, and strung similarly. Start with Treadle #1 and work to the right, only routing cables around the corresponding pulleys of the Lower Side Pulley Assembly. Attach the treadles as described in step #3.



ROUTING OF MODULAR TREADLE CABLES

FIG. 18

INSTALLING BEAMS AND ROLLERS (Dobby/Modular)

1. Rear Cloth Storage System Rollers

A. Upper & Lower Rollers

Now the roller tubes for the rear cloth storage system can be installed. Here's all there is to it.

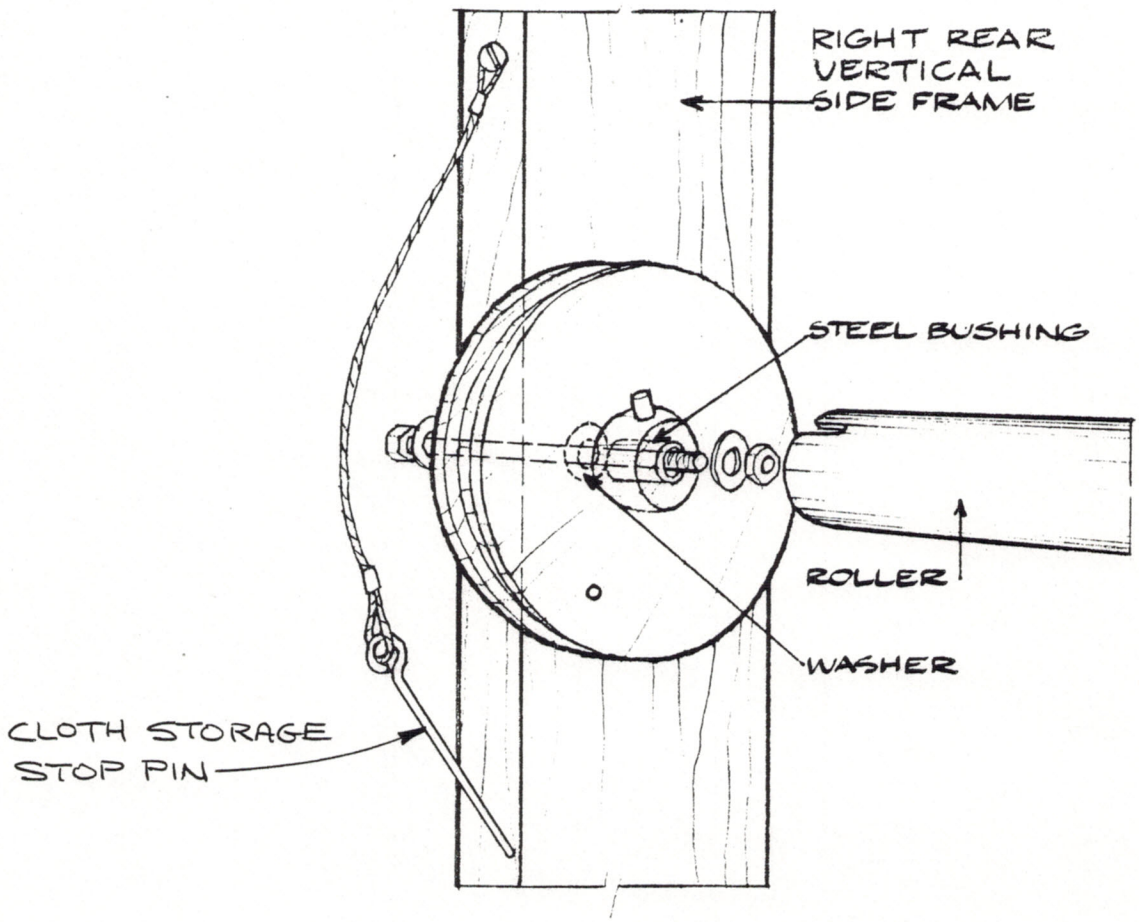
Drop the upper cloth roller #26 into the slotted brackets. (See figure 1 for placement.) Then pick up the lower cloth roller #27 and slip one end into its pinned slot. Pull the pin out of the other bracket, drop the roller in, replace the pin and you've done it.

B. Cloth Storage Drum

Locate the cloth storage drum #29 (it's a drum with white dacron cord wrapped around it). (See figure 19 on next page.)

Take off the washer and nut and pull the bolt out of the assembly. Now, keeping the washer next to the head of the bolt, insert the bolt through the corresponding hole in the right rear vertical from the outside of the loom. Slip a washer on from the inside.

Now slide the metal bushing, then the wooden drum (with the flat face toward the side frame), onto the bolt. Add another washer, the hex nut and tighten down.



CLOTH STORAGE DRUM

FIG. 19

C. Cloth Storage Roller

Locate the Cloth Storage Roller #28. It has a pin sticking out one end and a notch cut out of the other end. Line the notch up with the pin on the small wooden bushing located on the inside of the cloth storage drum. Push the roller toward the cloth storage drum until the roller seats itself against the drum. Slip the other end of the roller into its bracket on the left rear vertical.

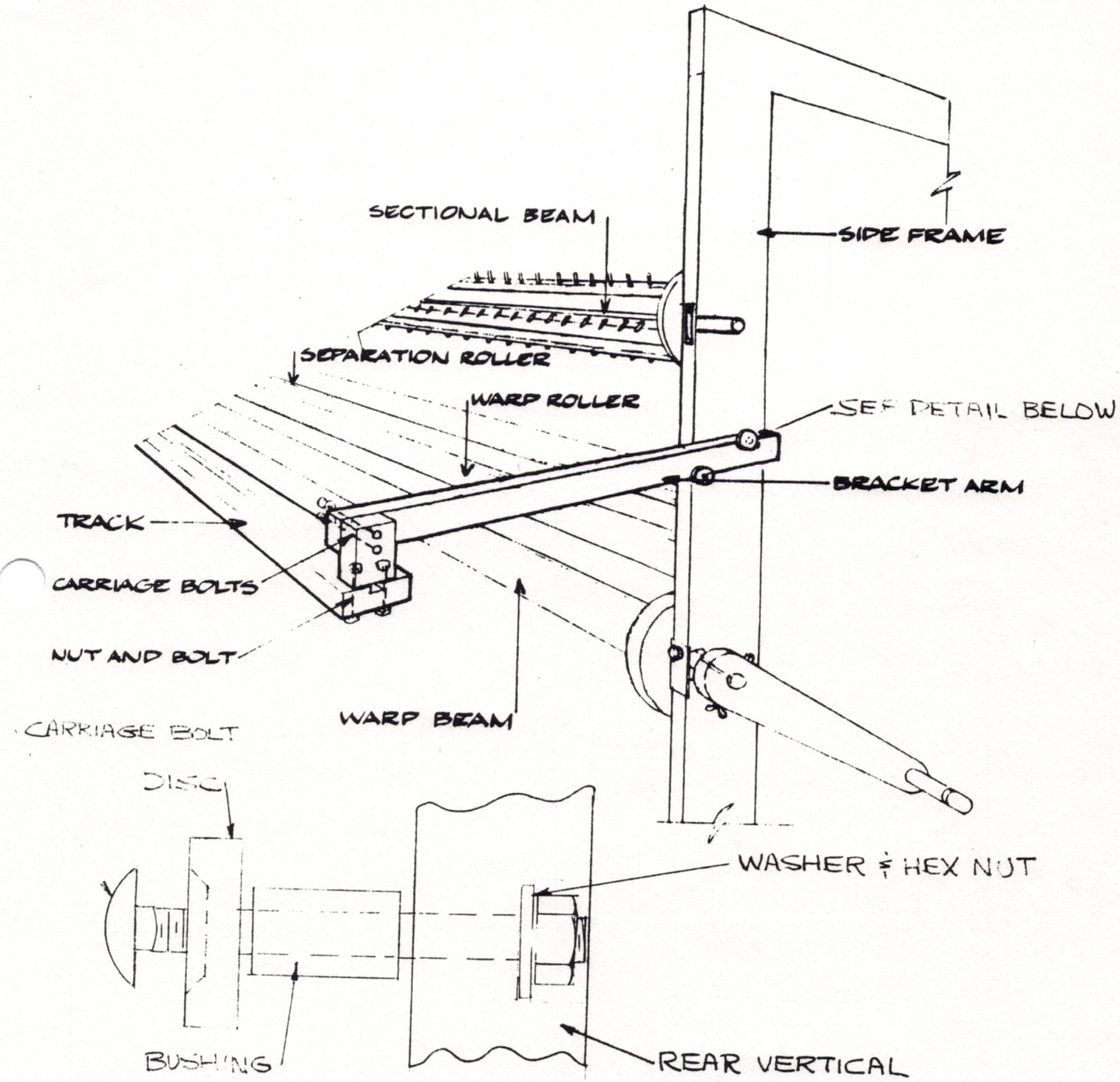
Notice the cloth storage stop pin in Figure 19. This pin should be inserted into the hole in the Cloth Storage Drum. For safety it should remain there until the Cloth Storage Roller is attached to the warp.

2. Installing the Standard Warp Beam

Install the Standard Plain Warp Beam in the two slots in the back edge of the rear verticals. (See figure 20) The ends of the warp beam are locked in place by the swiveling thumb screw latches. Included in the contents of your hardware bag, were two thumbscrews. These can now be screwed slightly into the threaded inserts directly above each warp beam slot. Lift up the warp beam, and with the drum to the left side of the loom, seat the beam axle into the slots. Swing the thumb screw latches around to meet the thumbscrews. When the latches have captivated the axle and are in a vertical position, tighten them down.

3. Warp Beam Handle

Locate your Warp Beam Handle #42. (See figure 20) Remove the wing nut, washer and bolt from the end of the handle. Place the hole in the handle over the left end of the warp beam axle. (Making sure the handle faces away from the loom.) Line up the hole in the axle with the carriage bolt and push it through. Reattach the washer and wing nut, and tighten.



WARP BEAM AND HANDLE MOUNTING ASSEMBLY

TENSION BOX MOUNTING ASSEMBLY FIG. 20

4. Installing the Second Plain Warp Beam (Optional Equipment)

Install the Second Plain Beam in the upper slots to the inside edge of the rear verticals.

Loosen the black thumbscrews enough so that the warp beam retainer latches can be swung off to the side. Lift up the second warp beam, and with the drum to the left side of the loom, seat the beam axle into the slots. Swing the thumbscrew latches around to meet the thumbscrews and when the latches have captivated the axle and are in vertical position, tighten them down.

5. Installing Tension Box Arms (Optional Equipment)

If you've ordered a Tension Box and a Sectional Beam, you'll need to assemble the tension box track arm mounting studs to the side frame prior to installing the sectional beam. Here's how to do it. Out of your Tension Box Hardware Bag, locate four 5/16" x 2 3/4" carriage bolts, black discs and bushings, washers and hex nuts. Insert the bolt through the hole in the black disc so that the square part under the head of the bolt makes contact with the countersunk portion of the disc. Slide the black bushing onto the bolt. Now install this assembly, from the outside of the loom, through one of the two holes provided on either rear vertical, as shown in Figure 20. Slip the washer and nut on the inside of the loom frame and tighten with a 9/16" socket wrench. Repeat this process with the remaining three bolts.

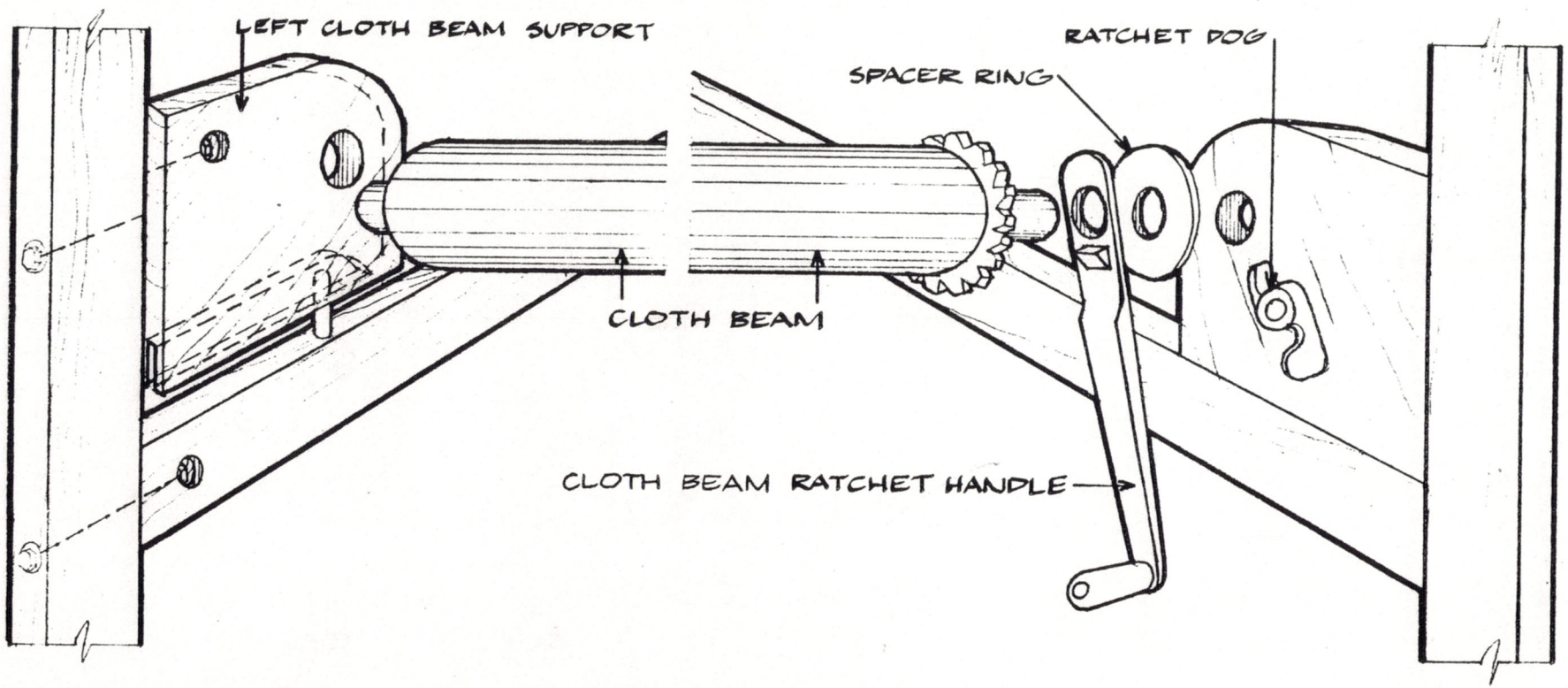
6. Installing the Sectional Beam (Optional Equipment)

Install the Sectional Beam in the upper slots to the inside edge of the rear verticals. Loosen the black thumbscrews enough so that the warp beam retainer latches can be swung off to the side. (This next step is easiest with the help of a friend.) Now, lift the sectional beam through the inside of the loom, into the space between the harness cables and the rear vertical. Make sure that the large drum end of the beam is toward the left side of the loom. Fit the axle into the slots and swing the thumbscrew latches around to meet the thumbscrews. When the latches have captivated the axle, and are in a vertical position, tighten them down.

7. Installing the Cloth Beam

A. Removing the Left Cloth Beam Support

The cloth beam can be taken in and out of the loom simply and easily by removing the top section of the left cloth beam support. (See figure 21) Using your crescent wrench or socket, turn the upper bolt (shown clearly in the drawing) counter clockwise until the nut disengages it. Pull the bolt until the upper portion of the cloth beam support can be lifted out.



CLOTH BEAM ASSEMBLY

FIG. 21

B. Assembling the Cloth Beam Handle

Locate your Cloth Beam. It is the beam with the ratchet on one end.

Now locate your cloth beam handle (also called cloth beam ratchet handle) and wooden spacer ring. Insert the ratcheted end of the cloth beam into the hole in the cloth beam handle (with the wooden part of the handle facing the inside of the loom) then into the spacer ring. Insert the other end of the cloth beam into the large hole in the upper portion of the cloth beam support that was removed in step A.

C. Assembling the Cloth Beam

Slip the end of the cloth beam with the ratchet, handle and spacer ring into the corresponding hole in the right cloth beam support. Now bring down the left end of the beam and fit the pin, belonging to the lower portion of the left cloth beam support, into the slot, belonging to the upper portion. Reinstall the bolt and tighten the square nut.

INSTALLING THE SEAT (Dobby/Modular)

The Seat #14 can now be put into place. The metal brackets that are attached to it go against both front verticals with a 3/8" x 3 3/4" hex bolt going through each front vertical, the brackets, and the seat itself. You will notice that there are four holes in each front vertical for mounting the seat. This gives you the option of two seat mounting locations. Choose the one that you feel is best for your particular height. An extra washer has been supplied with each of these bolts so that a washer can also be placed between the front vertical and the seat bracket. A 3/8" x 2" carriage bolt goes through each front vertical at the bottom of the bracket and is used to adjust the seat for comfortable sitting. (This seat can also be used as a back rest during threading. If you want to try it out as a back rest, just leave the carriage bolt to the side for now and insert it following threading.) For looms with the optional short bench, a 3/8" x 3 1/4" hex bolt goes through the seat support and the seat and is attached with a square nut.

TENSION ARM INSTALLATION (Dobby/Modular)

1. Standard Warp Beam Tension Arm

   Locate the tension arm #16. Now locate the disc shaped black metal weight and handle.

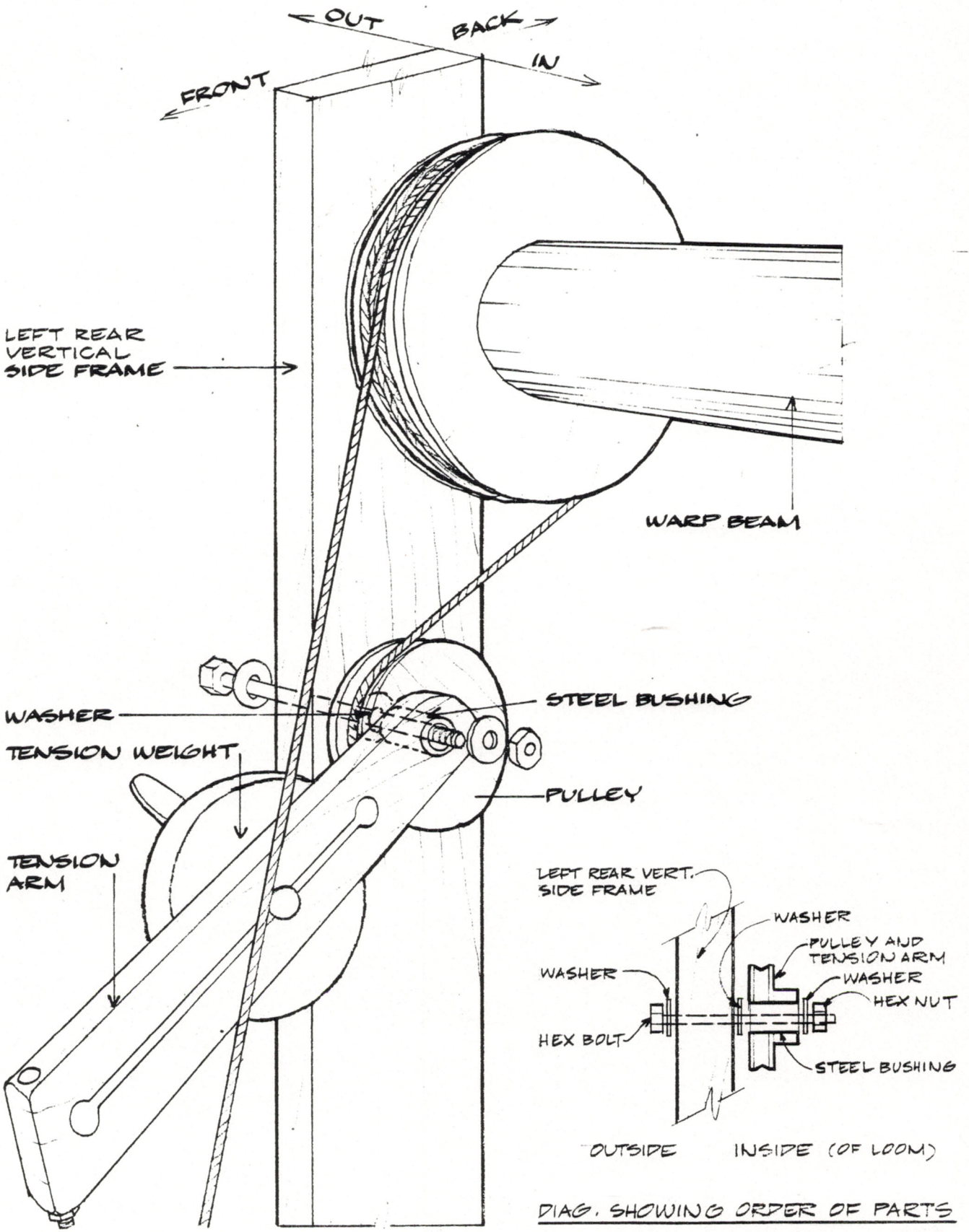
   Orient the arm so that the face of the pulley will lie against the inside of the left rear vertical as shown in figure 22. (Refer to figure 1 to locate the relative position of tension arm #16.)

   Remove the long bolt from the pulley end of the tension arm. Keeping one washer on the bolt, push the bolt through the lower hole in the rear vertical from the outside. Now put another washer on and slip the tension arm, with its metal bushing, onto the bolt. Now another washer and the hex nut, tighten it down and it's on.

After tightening, check to make sure the arm swings freely.

Now the rope tie-up can be made.

The tension arm comes with the rope and clip attached. Anchored to the left lower horizontal member of the loom are an eyebolt, adjustment cord and clamp, and a spring. These complete the tension adjustment system. Now, referring to figure 22, make the rope tie-up. The rope comes out of the hole in the tension arm pulley, then under that pulley and up to meet the rear side of the standard warp beam drum. Now wrap the rope around the warp beam drum three times, with the first wrap toward the outside of the loom. Okay, so far so good. The clip on the end of the rope should be hanging down off the front of the drum. Attach this clip to the spring that's anchored to the lower horizontal. Pick up the disc shaped weight with handle and remove both the handle and the washer from the weight. Now remove the carriage bolt and insert it, from the inside of the loom, into the slot in the tension arm. Slip the washer on next, then the weight and finally the handle, and tighten.



DIAG. SHOWING ORDER OF PARTS

STANDARD BEAM TENSION ARM

FIG. 22

2. Second Plain Beam Tension Arm

Locate the tension arm #38P. Now locate the disc shaped black metal weight and handle.

Orient the arm so that the face of the pulley will lie against the inside of the left rear vertical as shown in figure 23. (Refer to figure 1 to locate the relative position of tension arm #38.)

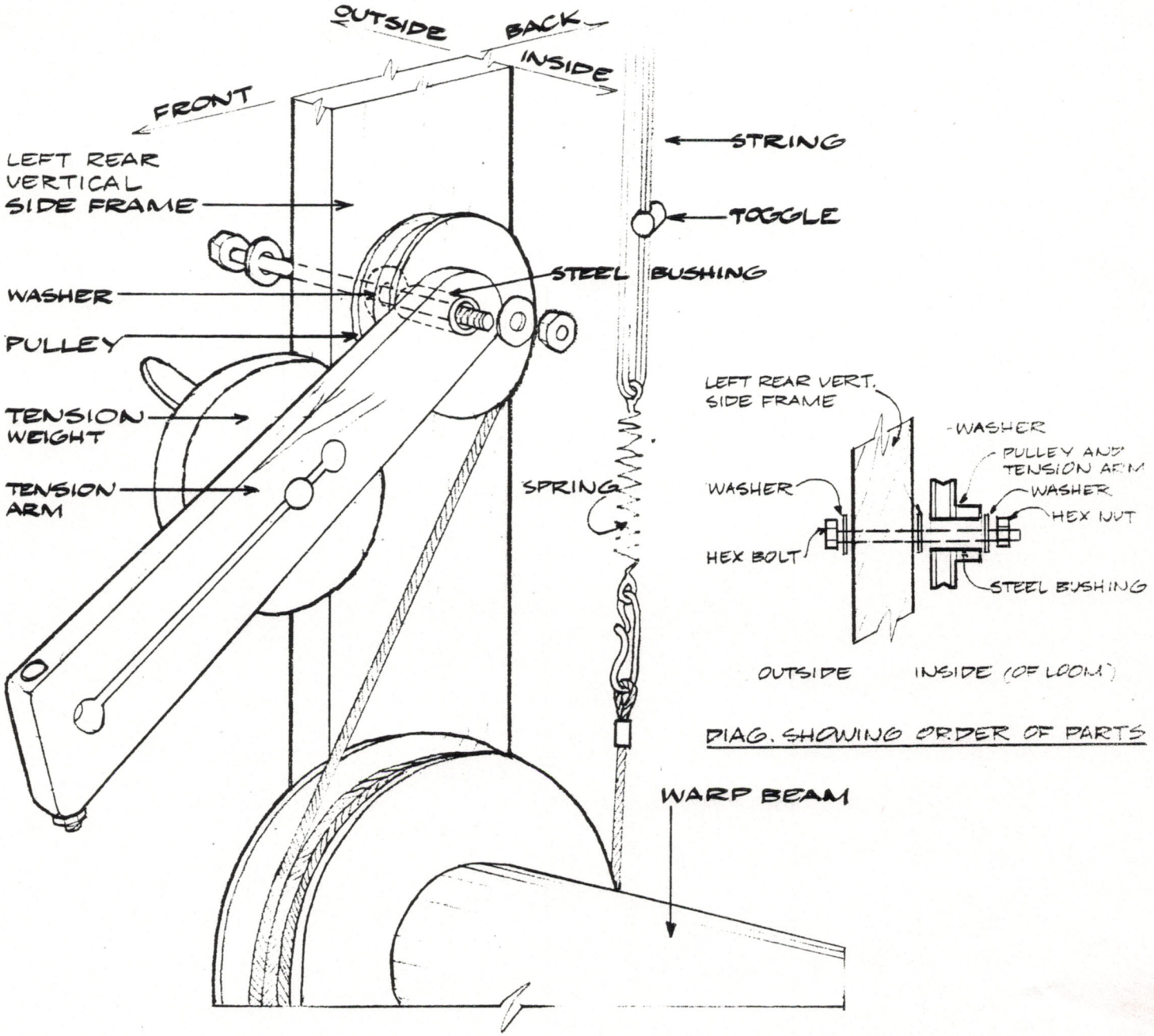
Remove the long bolt, with its nut and washers, from the pulley end of the tension arm. Put one of the washers back on the bolt and push the bolt through the upper hole in the left rear vertical side frame member from the outside. Now put another washer on and slip the tension arm, with its metal bushing, onto the bolt. Now another washer, the hex nut, tighten it down and it's on.

After tightening, check to make sure the arm <u>swings freely</u>.

Now the rope tie-up can be made.

The tension arm comes with the rope and clip attached. Anchored to the left upper horizontal member of the loom are an eyebolt, adjustment cord and clamp, and a spring. These complete the tension adjustment system. Now, referring to figure 23 make the rope tie-up. The rope comes out of the hole in the tension arm pulley and down to meet the front of the second warp beam drum. Now, wrap the rope around the warp beam drum, three times, as shown, with the first wrap toward the <u>outside</u> of the loom. After completing the third wrap, bring the clip on the end of the rope up to meet the spring that's anchored to the loom and clip them together. Okay, wonderful.

Now, pick up the disc shaped weight with handle and remove the carriage bolt. Insert the bolt, from the inside of the loom, through the slot in the tension arm. Slip the washer on next, then the weight and finally the handle, and tighten.



DIAG. SHOWING ORDER OF PARTS

SECOND PLAIN WARP BEAM TENSION ARM

FIG. 23

3. Sectional Beam Tension Arm

Locate the tension arm #38S. Now locate the disc shaped black metal weight and handle.

Orient the arm so that the face of the pulley will lie against the inside of the left rear vertical as shown in figure 24.

(Refer to figure 1 to locate the relative position of tension arm #38.)

Remove the long bolt, with its nut and washers, from the pulley end of the tension arm. Put one of the washers back on the bolt and push the bolt through the upper hole in the left rear vertical from the outside. Now put another washer on and slip the tension arm, with its metal bushing, onto the bolt. Now another washer, the hex nut, and tighten it down.

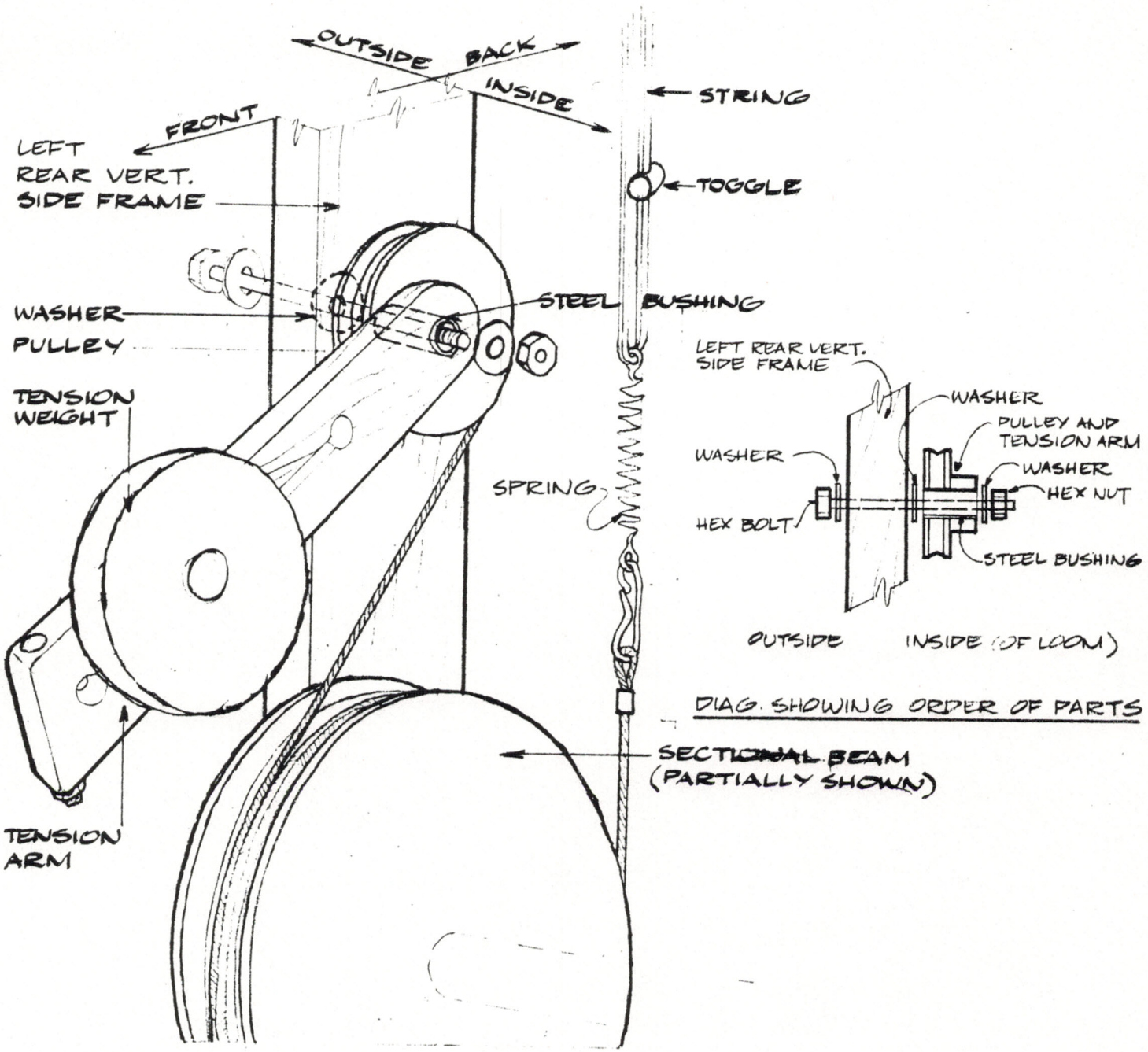
After tightening, check to make sure the arm swings freely.

Now the coated cable tie-up can be made. The tension arm comes with the cable and clip attached. Anchored to the left upper horizontal member of the loom are an eyebolt, adjustment cord and clamp, and a spring. These complete the tension adjustment system. Now, referring to figure 24 make the cable tie-up. The cable comes out of the hole in the tension arm pulley and down to meet the front of the sectional beam brake drum. Now, wrap the cable around the sectional beam drum three times, as shown, with the first wrap toward the outside of the loom. After completing the third wrap, bring the clip on the end of the rope up to meet the spring that's anchored to the loom and clip them together. Now pick up the disc shaped weight with handle and remove the carriage bolt. Insert the bolt, from the inside of the

loom, through the slot in the tension arm. Slip the washer on next, then the weight, and finally the handle, and tighten.

For light to medium warp tension, using the sectional beam, the weight should be located to the outside of the tension arm as shown in the drawing. For tighter warp tensions, the weight should be located to the inside of the tension arm so as not to interfere with the upper left horizontal while advancing the warp. (Instructions are given in the weaving manual, as to how to use the tension system, so don't let that concern you now.)

Now it's time to sit back, have a cup of tea, and admire your loom. Coming along quite nicely isn't it? Very good, now back to the fun.



SECTIONAL BEAM TENSION ARM

FIG. 24

BOTTOM SWING BEATER ASSEMBLIES (DOBBY/MODULAR)

The Beater supports can now be bolted to the loom. First, locate your beater supports #34. There's one for each side of the loom, so we'll start on the right side and you can refer to figure 1 for correct placement.

Orient one of them so that the round spacers and metal pins are facing toward the loom and the spacer with the threaded rod and metal bracket is toward the front of the loom.

Remove the hex nut and washer from the rear spacer and insert the bolt through the right lower horizontal. Slip the washer and nut back on and tighten. Now remove the two screws located in the top edge of the lower horizontal. Position the metal bracket that's attached to the wing nut bolt over the two holes and reinsert the screws. Tighten them down. Repeat this process for the left side.

1. Standard Beater

   Locate the race, beater top, two legs, reed, and hardware. (See figure 25)

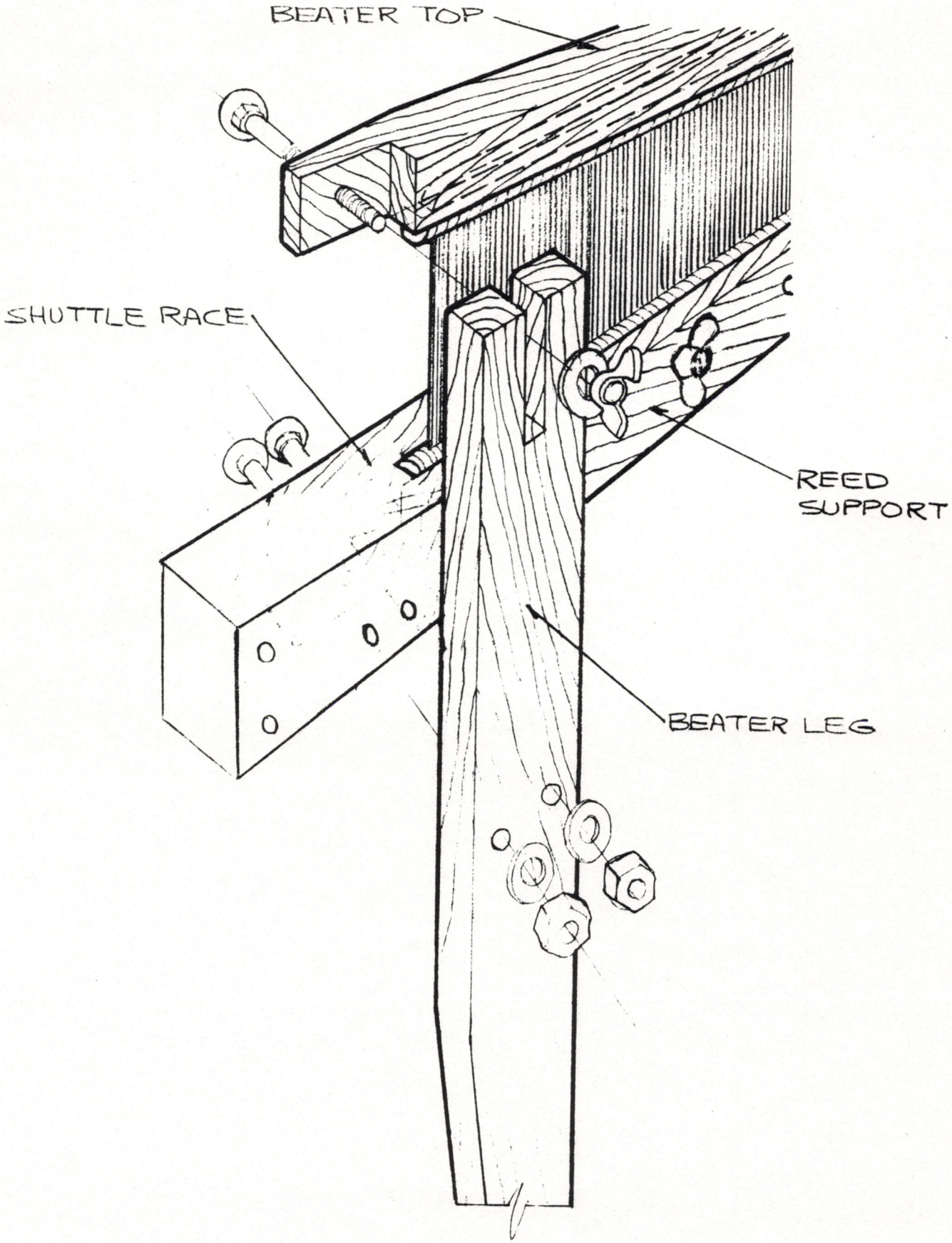
   Now pick up the race and orient it so that the lengthwise groove is facing up and the notches taken out at either end are toward the rear of the loom.

   Position it in the loom so that it is resting on the cloth beam supports. Now empty your hardware bag onto a table top. Pick up the four 5/16" x 3" carriage bolts with washers and hex nuts.

Using either leg, orient it so that, with the bottom slot riding in the center pin on the beater support, the tapered side of the leg faces away from the loom. Insert the bolts, from the front of the race, through the race and into the corresponding holes in the beater leg. Attach washers and nuts and tighten slightly. Repeat this procedure for the other side of the loom, making sure that the tapered side of the leg is always facing away from the loom. Attach the washers and nuts and tighten securely. Now go to the side you did first and tighten down those nuts.

Insert the reed into the groove at the top of the beater race. Picking up the beater top, orient it so that the groove is toward the floor and the notches cut out at either end are facing toward the rear of the loom.

Remove the wing nuts and washers from the 1/4" x 2 1/2" carriage bolts. Insert the bolts into the holes in the front of the beater top, located at each end. Slide the bolts down into the slots in the top of each leg and secure with washers and wing nuts. Make certain that the reed is captured by the lengthwise groove in the beater top.



STANDARD BEATER

FIG. 25

2. Single Box Flyshuttle Beater (Optional Equipment)

Locate the shuttle race, beater top, two legs, hardware, string tie-up, reed, and reed support. (See figure 26) Pick up the race and orient it so that the lengthwise groove is facing toward the rear of the loom and the shorter flyshuttle box-sides are towards the front. Now lay the race across the loom, in the approximate position it will be when in use.

Empty your hardware bag on a table top. Separate the 5/16" x 3" carriage bolts, washers and hex bolts. Look at your beater legs. They are identified as to left and right by a stamp. Orient it so that the cut out section is toward the front of the loom and the tapered side of the leg to the outside. Position the notch, located at the bottom end of the leg, over the center pin in the beater support. Now, attach the race to the leg using two of the 5/16" x 3" carriage bolts. Slip on the washers and nuts and attach loosely. Repeat the procedure above for the left side making sure the tapered side of the beater leg faces away from the loom. Tighten the nuts on the left side.

Shipped in the beater race were seven carriage bolts. The washers and wing nuts for these are on the table top with the remainder of the beater hardware. Push the carriage bolts through the race so that their heads sit flat on the front of the beater race. Now, carefully slide the reed support onto the seven bolts so that the lengthwise groove in it faces the groove in the race. Leave enough room so that you can fit the reed in between the race and the reed support. Once the reed is in, the washers and wing nuts can be fitted onto the carriage bolts, one at a time. Start by slipping the washer and wing nut onto the center most bolt. Once this is fairly secure, do the same for the right side, then the left. Then

assemble the remaining bolts and tighten them well, as a perfectly straight and secure reed will assure a good straight run of the shuttle.

Now, orient your beater top so that the groove is facing down and the cut outs at either end are facing toward the rear of the loom. Insert 1/4" x 2 1/2" carriage bolts into the holes located at each end, starting them from the front. Placing the beater top over the race and reed, slide the bolts into the slots at the top of the beater legs and, once the reed is securely inside the groove in the beater top, attach the washers and wing nuts and tighten. Now securely tighten the carriage bolts that attach the legs to the race.

Take the string tie-up and handle from its bag. As you can see, there are three eyelets coming out of the handle. One at the top and two at the sides. Hold the handle up by the clip attached to the string at the top of the handle. This clip will get attached to the eyelet that is taped to the bottom or inside of the front harness pulley support. However, the eyelet must first be screwed into the hole on the underside of the harness pulley support. So, first screw the eyelet in so that no screw threads are showing, then attach the clip to it.

At this point, there are two pickers hanging below the handle. Take one of these and orient it so that the leather loop is toward the bottom. Now take it to the very outside of the race on the right side. Slide the picker, with the leather loop down and toward the outside, into the slots between the box sides.

Now look up at the top right horizontal side frame member and notice a small wooden vertical bar, attached with two bolts, with an eyelet at the bottom edge. This eyelet should be almost directly above the picker. The clip at the end of the cord that attaches to the picker should be clipped to the eyelet at this point.

Now, pick up the left picker, and with the leather loop down and toward the outside slide it into the grooves in the box sides from the very outside of the race. Attach the clip at the end of the cord to the eyelet. Now, notice that there is a snubber attached to the front box on each side of the race. The cord should go over the snubbers.

This completes the assembly of the Single Box Flyshuttle Beater.

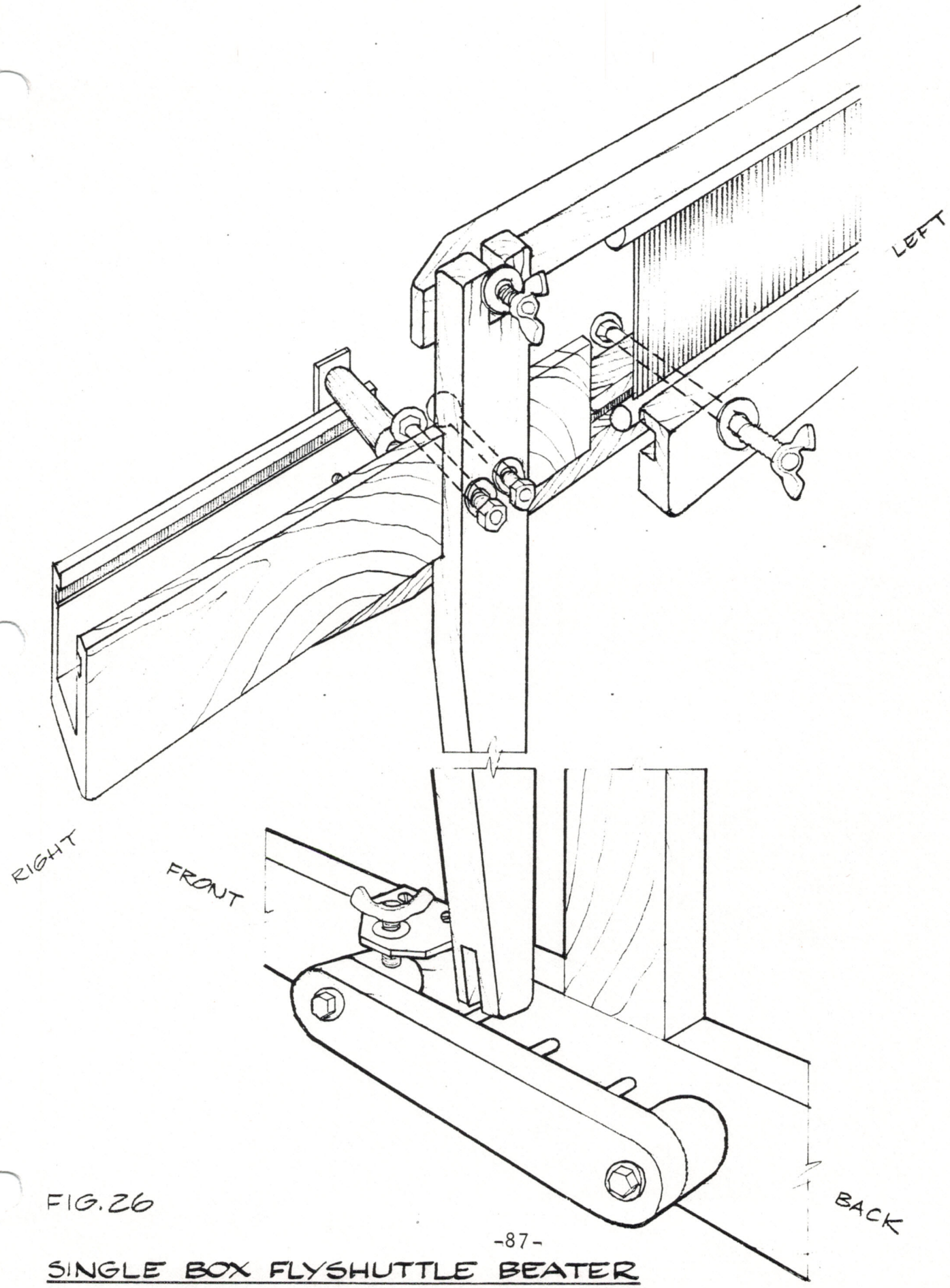


FIG. 26

SINGLE BOX FLYSHUTTLE BEATER

OVERHEAD BEATER ASSEMBLIES (DOBBY/MODULAR)

1. Overhead Standard Beater (Optional Equipment)

This system is shipped partially disassembled to facilitate packing. Follow the instructions below to complete the assembly. Please refer to figures 27 through 32 for help with terminology and locations.

A. The first step of this assembly is to mount the Beater Adjustment Bases to the outside face of each Top Horizontal on the assembled side frames of your loom. See figures 28 and 31. Attach these parts using the four 1/4" x 2 1/4" flat head machine screws. Making sure that the notched ends of these parts face upward insert the screws from the inside of the loom and attach the washers and nuts to the outside of the Beater Adjustment Base. Tighten the four screws securely.

B. Lay the two Uprights on the floor with the tapered edges to the outside. Lay the Shuttlerace on top of the two Uprights so that it covers the two holes that have been drilled through the Uprights. There is a groove cut in one side of the Shuttlerace which must be oriented to the top and back of the race which means that it should, for now, be facing down toward the floor. Attach the Shuttlerace to the Uprights with two 5/16" x 3 1/4" carriage bolts, one on each side. You will see that there are two holes on each end of the Shuttlerace that correspond with the two holes on either Upright. For now only the innter-most hole on each end will be used. The outer holes take a different bolt and will be used later. Do not tighten the bolts just yet, as you will be making some adjustments shortly.

C. Temporarily attach the Beater Top to the front of the Uprights with two 1/4" x 2" carriage bolts with washers and wing nuts behind the Uprights. The Beater Top should be attached to the same side of the Uprights as the Shuttlerace. You do not need to put the Beater Top on now, but if you do it will help in creating proper alignment of the beater parts.

D. Place the beater in the loom. For now it will just sit in the loom resting on top of the Cloth Beam Supports. The assembly may tend to fall forward or backward but don't worry about that. You now have some other assemblies to complete before actually attaching the beater.

E. With the Shuttlerace assembly resting in the loom your next step is to install the Crosspiece assembly. See figure 27. This assembly sits on top of the loom with the two aluminum Beater Adjustments Brackets placed into the small grooves on top of the Beater Adjustment Bases that you installed a few minutes ago. The small wooden blocks at either end of the Crosspiece should be facing the front of the loom. No hardware will be necessary to hold the Crosspiece in place.

F. The next step is to mount the Hanging Arms to the Upright on the Shuttlerace assembly (see figures 27 and 30). Using an 1/8" Allen wrench, remove the 3/8" stop collars from the shafts at the tops of each Uprights and install the Hanging Arms onto these shafts making sure that the right and left Hanging Arms are in their proper positions. Also be certain to include the small spacer as shown. The stop collars are then replaced and tightened making sure to leave enough clearance for this pivot point to swing freely. Now mount the other end (the top) of the Hanging Arms to

the Crosspiece. This is done by lining up the corresponding holes and fastening (loosely for now) with two 5/16" x 2 1/2" hex bolts with washers and hex nuts.

G. The next step is a simple one. Insert the Axle (shown in figures 27 and 28) into the loom. It will go through the large holes in your Rear Side Supports of the side frame assembly. There is no particular right or left orientation for this Axle as it is the same on both ends. After the Axle is inserted place an Axle Spacer on each exposed end of the centered Axle.

H. Now locate the Tilting Arm assemblies (2). They are stamped "L" and "R" and are to be mounted at each end of the Axle as shown in figures 28, 29, and 32. It is important to mount this assembly correctly as shown, with the Push Arms to the outside and the Tilting Arms to the inside. The Tilting Arms are attached to the ends of the Axle with 5/16" x 2 3/4" hex bolts with washers and hex nuts provided. Do not tighten these bolts yet. They will be part of a critical adjustment coming up shortly. You will see a spring/cord/eyebolt assembly hanging from each Tilting Arm. Just let them hang for now. They will be attached later.

I. Next mount each Push Arm to the back face of each Upright (see figure 28) using two 5/16" x 4 1/2" hex bolts, washers, and square nuts. These bolts go through the Shuttlerace and Uprights and end up in a square nut in the nut access hole of each Push Arm. You can go ahead and tighten these bolts making sure that the outer face of each Push Arm is relatively flush with the outer edge of their mating Uprights. This is also a good time to go ahead and tighten the other bolts that we previously told you to

leave loose. While tightening these bolts you should see that the beater is relatively square and centered in the loom. The last bolts to tighten are the hex bolts that we shall for now call the "Racking Adjustment Bolts" that connect the Tilting Arms to the Axle (see figure 32). These bolts should be tightened while the entire beater is being held firmly against the Beater Bumpers - either front or rear, it makes no difference. If you are performing this assembly alone you may hold the beater against the rear Beater Bumper Blocks by using the Beater Retainer that is located on the inside of the left Cloth Beam Support (see figure 28). If the beater won't be held by the Retainer then you will have to raise the beater by adjusting the Beater Adjustment Screws as shown in fugure 31. Once raised to a sufficient height the Beater Retainer will hold the Beater Assembly against the Beater Bumper Blocks, leaving you free to tighten the two "Racking Adjustment Bolts" while the beater is in its correct position. If the beater assembly should become out of square, that is if one side of the beater should hit its bumper before the other side, you will have to adjust the Tilting Arms as shown in figure 32. This adjustment is made with the "Racking Adjustment Bolts" loosened and pushing the Tilting Arms accordingly against each other until a good adjustment is achieved, then tighten the bolts. This adjustment is best done with two people.

J. Now is a good time to attach the Beater Return Spring assembly. This is the previously mentioned spring/cord/eyebolt assembly that hangs from each Tilting Arm. To attach this assembly simply remove one hex nut and washer from the eyebolt and place the eyebolt through the hole provided on each Bottom Horizontal of the side frame assembly. (See figure 28) The eye of the bolt

should be to the outside of the side frame and as close to the side frame as possible. Replace the washer and hex nut and tighten securely.

This assembly is used to assist the weaver in returning the beater to the back position. It is not necessarily intended to hold the beater in this position, as that is the purpose of the Beater Retainer.

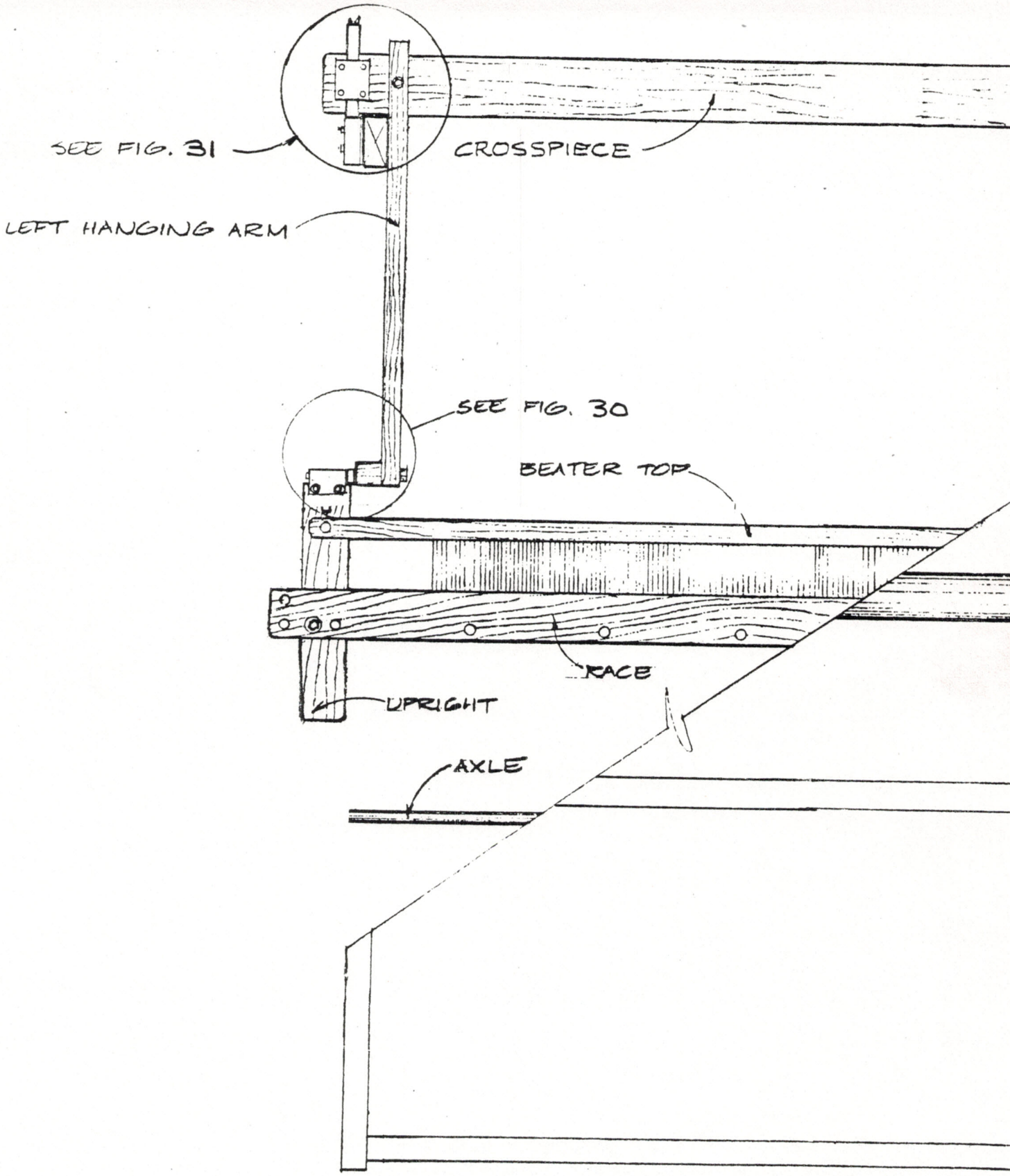
The Beater Return Spring assembly is adjustable. It is tightened by pulling on the ends of the white cord while squeezing the black Mini Cord Lock on the assembly. Whenever an adjustment is made on one side of the beater a similar adjustment should be made on the other side as well. The amount of tension you set these springs at is strictly a matter of preference. Generally speaking, the stronger the tension, the harder you will have to pull against these springs during the beat. At the same time, however, it will be easier to hold the beater away from you while opening a shed and throwing the shuttle. You may wish to experiment with these adjustments in order to come up with a setting that works best for you and any particular warp.

K. Locate the Reed Support - the long, thin wooden part with seven holes and a slot similar to the one in the Shuttlerace. Attach the Reed Support to the back of the Shuttlerace with the slot to the top and facing the Shuttlerace, using seven 1/4" x 3" carriage bolts, inserted from the front, with washers and wing nuts behind. Before attaching the nuts, install the bottom edge of your reed in the void created by the slots in the Reed Support and Shuttlerace. Center the reed between the two Uprights and tighten the wing nuts.

L. There is a slot in the underneath side of the Beater Top which slides over the top edge of the reed. Push the Beater Top down on the reed and tighten the wing nuts which hold it in place.

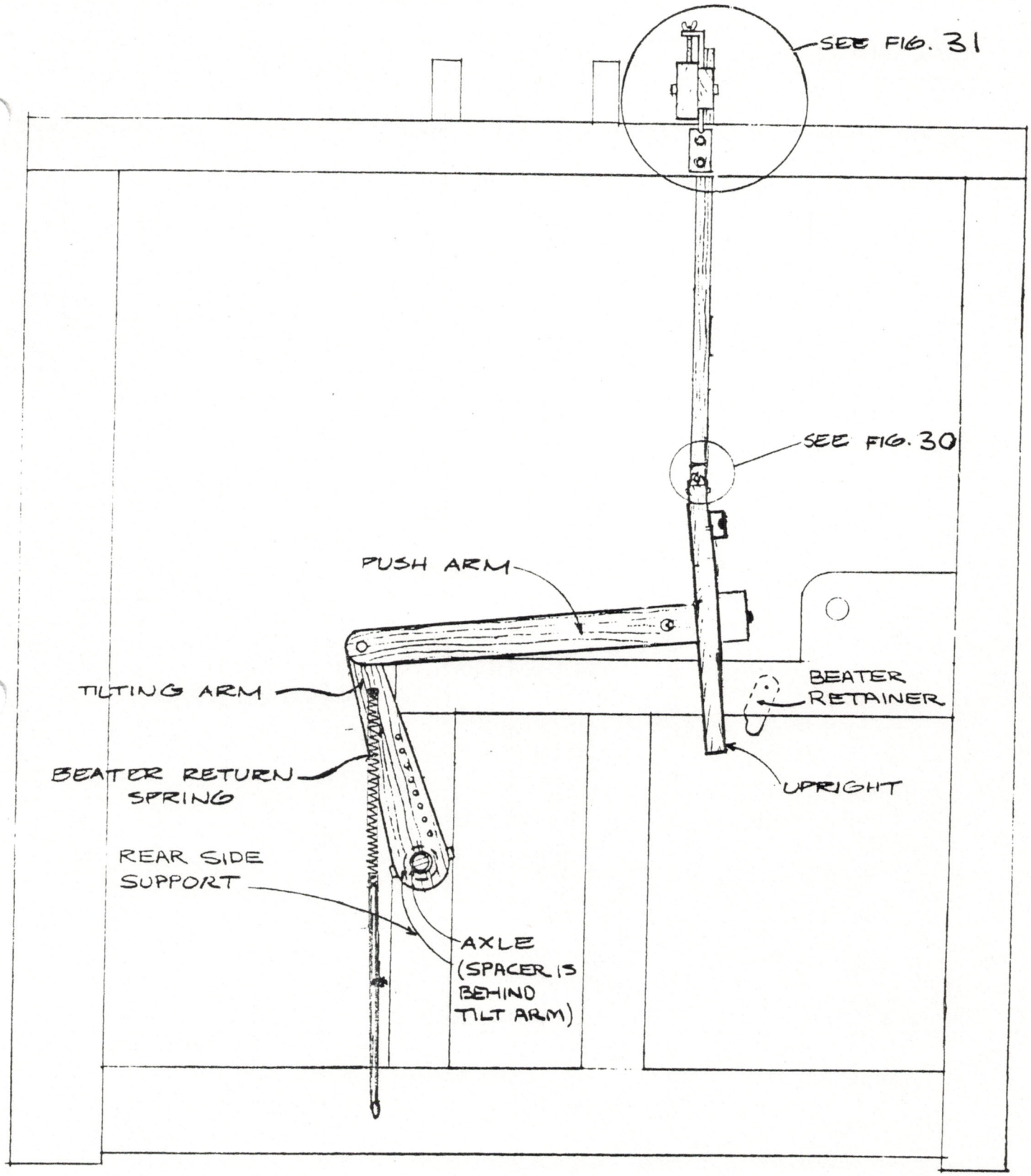
This completes the assembly of your Standard Beater.

Check your assembly with figure 37 to be certain you've gotten everything correct.



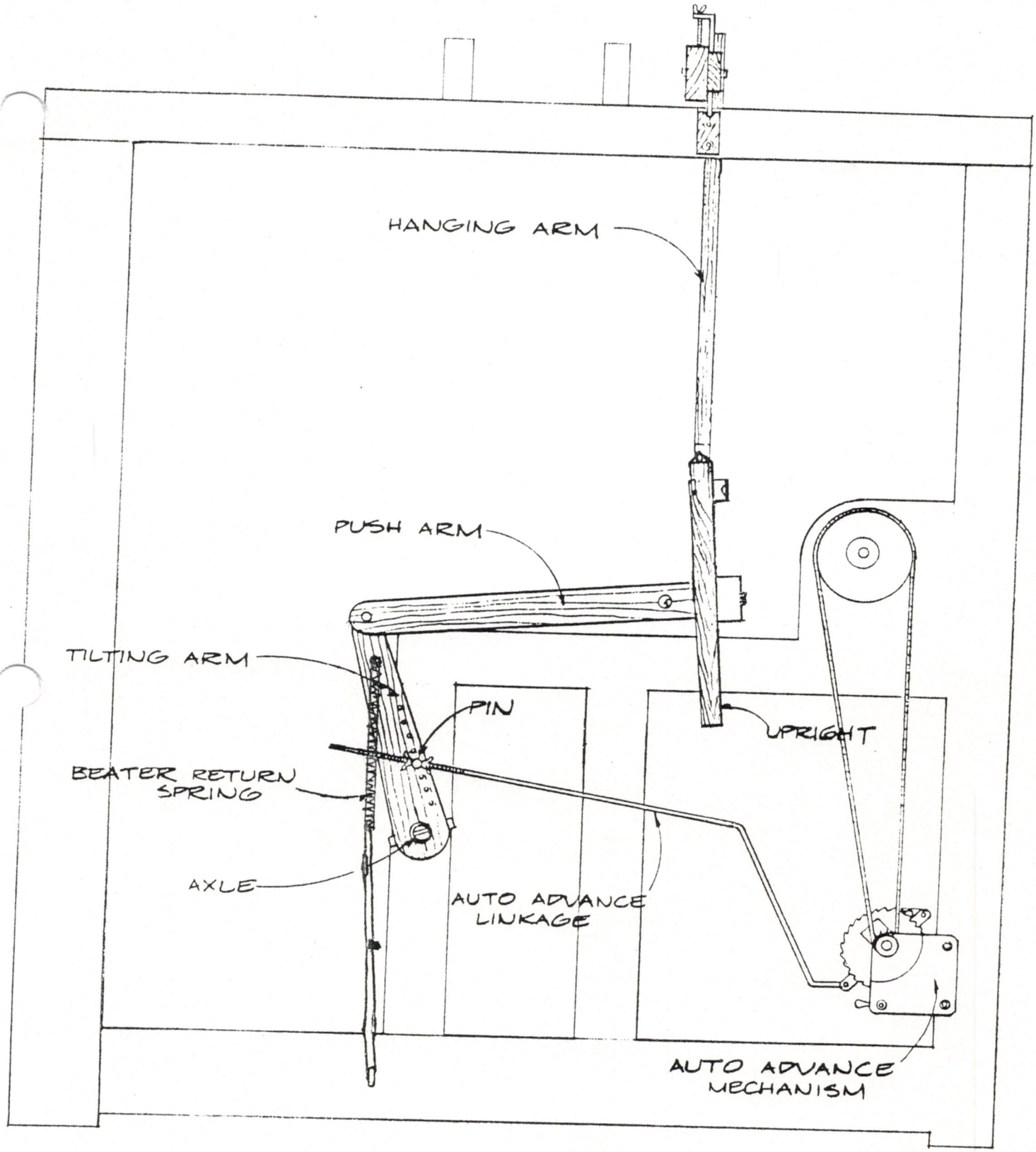
OVERHEAD
STANDARD BEATER
SHOWN FROM FRONT

FIG. 27



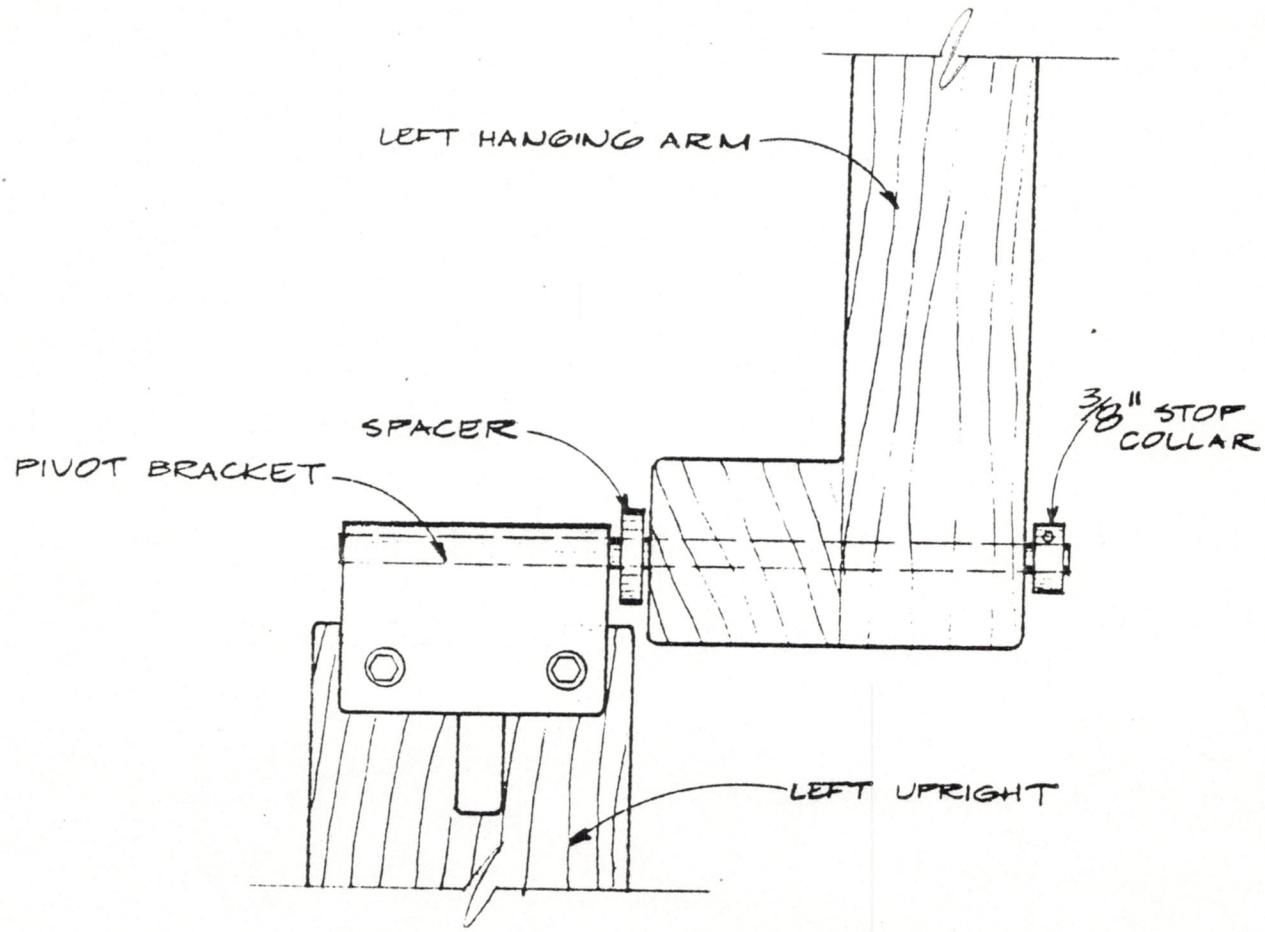
OVERHEAD
STANDARD BEATER
SHOWN FROM LEFT SIDE

FIG. 28



OVERHEAD BEATER WITH AUTO ADVANCE MECHANISM SHOWN FROM LEFT SIDE

FIG. 29

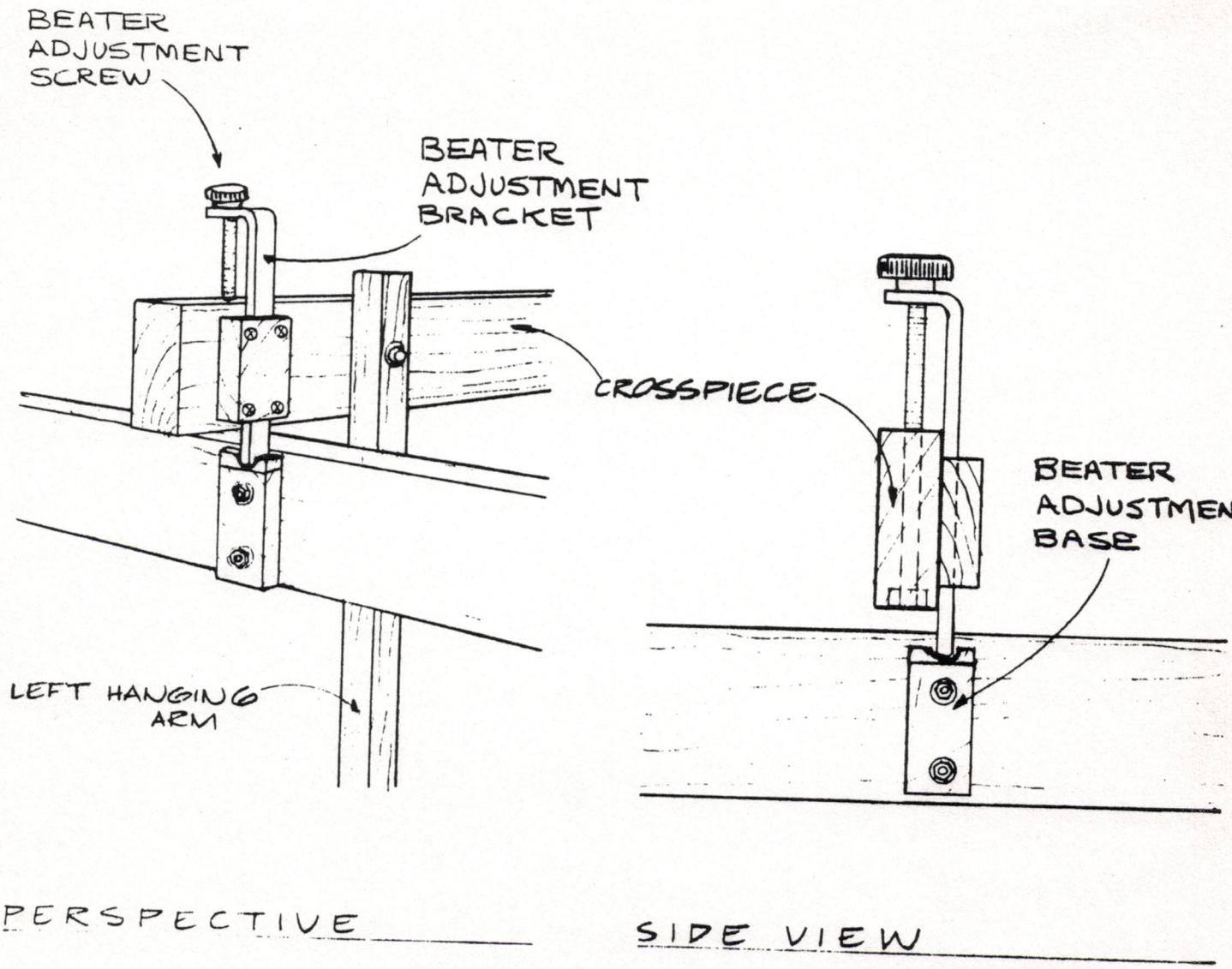


OVERHEAD BEATER

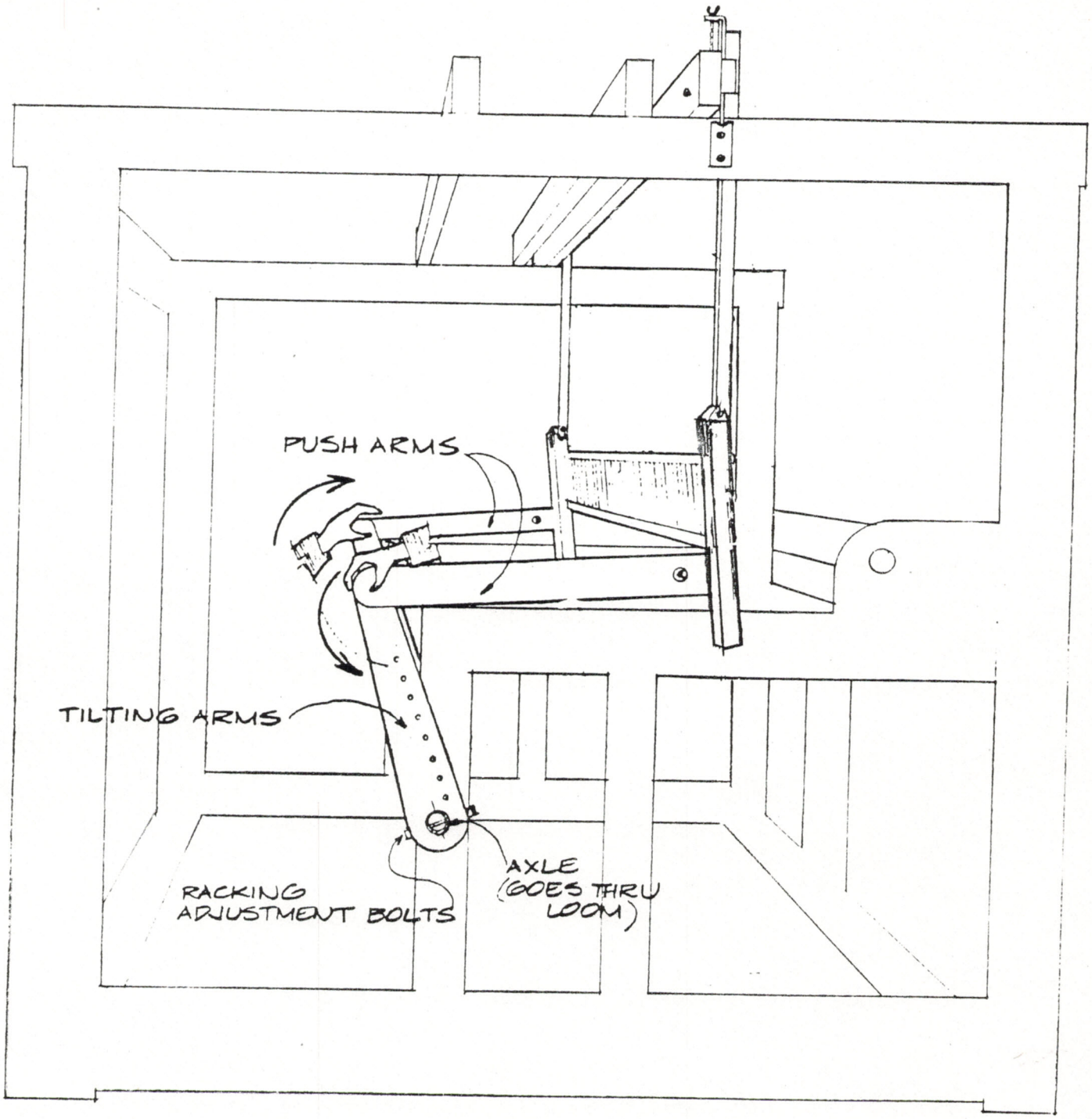
PIVOT BRACKET

SHOWN FROM FRONT

FIG. 30



OVERHEAD BEATER
ADJUSTMENT BRACKET FIG. 31



RACKING POSITION
OVERHEAD BEATER

FIG. 32

2. Overhead Single Box Flyshuttle Beater (Optional Equipment)

This system is shipped partially disassembled to facilitate packing. Follow the instructions below to complete the assembly. Please refer to figures 30, 31, and 33 through 36 for help with terminology and locations.

A. The first step of this assembly is to mount the Beater Adjustment Bases to the outside face of each Top Horizontal on the assembled side frames of your loom. See figures 34 and 31. Attach these parts using the four 1/4" x 2 1/4" flat head machine screws. Insert the screws from the inside of the loom and attach the washers and nuts to the outside of the Beater Adjustment Base making sure that the notched ends of these parts face upward. Tighten the four screws securely.

B. Lay the two Uprights on the floor with the notched sides facing up. The Uprights are labeled left and right, and it is important that these be properly oriented. Lay the Shuttlerace on top of the two Uprights so that the rear plywood box side fits into the large notch of each Upright. There is a groove cut in one side of the Shuttlerace which must be oriented to the top and back of the race which means that it should, for now, be facing down toward the floor. Attach the Shuttlerace to the Uprights with two 5/16" x 3 1/4" carriage bolts, one on each side. You will see that there are two holes on each end of the Shuttlerace that correspond with the two holes on either Upright. For now only the inner-most hole on each end will be used. The outer holes take a different bolt and will be used later. Do not tighten the bolts just yet, as you will be making some adjustments shortly.

C. Temporarily attach the Beater Top to the front of the Uprights with two 1/4" x 2" carriage bolts with washers and wing nuts behind the Uprights. The Beater Top should be attached to the same side of the Uprights as the Shuttlerace, with the long groove facing the Shuttlerace. Insert the carriage bolts through the holes near each end of the Beater Top and then through the slots that are located just below the metal bracket of each Upright. This will help in creating proper alignment of the beater parts.

D. Place the beater in the loom. For now it will just sit in the loom resting on top of the Cloth Beam Supports. The assembly may tend to fall forward or backward but don't worry about that. You now have some other assemblies to complete before actually attaching the beater.

E. With the Shuttlerace assembly resting in the loom your next step is to install the Crosspiece assembly. See figure 33. This assembly sits on top of the loom with the two Beater Adjustment Brackets placed into the small grooves on top of the Beater Adjustment Bases that you installed a few minutes ago. The screweye at the center of the Crosspiece should be facing down and the adjustment brackets should be facing the front of the loom. No hardware will be necessary to hold the Crosspiece in place.

F. The next step is to mount the Hanging Arms to the Upright on the Shuttlerace assembly (see figures 33 and 30). Using a 1/8" Allen wrench, remove the 3/8" stop collars from the shafts at the tops of each Upright and install the Hanging Arms onto these shafts making sure to put the right and left Hanging Arms in their proper positions. There is a screweye that has been mounted near the middle of each hanging arm. These screweyes should face the front of the

loom. Also be certain to include the small spacer as shown in figure 30. The stop collars are then replaced and tightened making sure to leave enough clearance for this pivot point to swing freely. Now mount the other end (the Top) of the Hanging Arms to the Crosspiece. This is done by lining up the corresponding holes and fastening (loosely for now) with two 5/16" x 2 1/2" hex bolts with washers and hex nuts.

G. The next step is a simple one. Insert the Axle (shown in figures 33 and 34) into the loom. It will go through the large holes in your Rear Side Supports of the side frame assembly. There is no particular right or left orientation for this Axle as it is the same on both ends. After the Axle is inserted place an Axle Spacer on each exposed end of the centered Axle.

H. Now locate the Tilting Arm assemblies (2). They are stamped "L" and "R" and are to be mounted at each end of the Axle as shown in figures 34, 35, and 36. It is important to mount this assembly correctly as shown, with the Push Arms to the outside and the Tilting Arms to the inside. The Tilting Arms are attached to the ends of the Axle with 5/16" x 2 3/4" hex bolts with washers and hex nuts provided. Do not tighten these bolts yet. They will be part of a critical adjustment coming up shortly. You will see a spring/cord/eyebolt assembly hanging from the end of each Tilting Arm. Just let them hang for now. They will be attached later.

I. Next mount each Push Arm to the back face of each Upright (see figure 34) using two 5/16" x 4 1/2" hex bolts, washers, and square nuts. These bolts go through the Shuttlerace and Uprights and end up in a square nut in the

nut access hole of each Push Arm. You can go ahead and tighten these bolts making sure that the outer face of each Push Arm is relatively flush with the outer edge of their mating Uprights. This is also a good time to go ahead and tighten the other bolts that we previously told you to leave loose. While tightening these bolts you should see that the beater is relatively square and centered in the loom. The last bolts to tighten are the hex bolts that we shall for now call the "Racking Adjustment Bolts" that connect the Tilting Arms to the Axle (see figure 36). These bolts should be tightened while the entire beater is being held firmly against the Beater Bumpers - either front or rear, it makes no difference. If you are performing this assembly alone you may hold the beater against the rear Beater Bumper Blocks by using the Beater Retainer that is located on the inside of the left Cloth Beam Support (see figure 34). If the beater won't be held by the Retainer then you will have to raise the beater by adjusting the Beater Adjustment Screws as shown in figure 31. Once raised to a sufficient height the Beater Retainer will hold the Beater Assembly against the Beater Bumper Blocks, leaving you free to tighten the two "Racking Adjustment Bolts" while the beater is in its correct position. If the beater assembly should become out of square, that is if one side of the beater should hit its bumper before the other side, you will have to adjust the Tilting Arms as shown in figure 36. This adjustment is made with the "Racking Adjustment Bolts" loosened and pushing the Tilting Arms accordingly against each other until a good adjustment is achieved, then tighten the bolts. This adjustment is best done with two people.

J. Now is a good time to attach the Beater Return Spring assembly. This is the previously mentioned

spring/cord/eyebolt assembly that hangs from the end of each Tilting Arm. To attach this assembly simply place the eyebolt through the hole provided on each Bottom Horizontal of the side frame assembly. (See figure 34) The eye of the bolt should be to the outside of the side frame and as close to the side frame as possible.

This assembly is used to assist the weaver in returning the beater to the back position. It is not necessarily intended to hold the beater in this position, as that is the purpose of the Beater Retainer.

The Beater Return Spring assembly is adjustable. It is tightened by pulling on the ends of the white cord while squeezing the black Mini Cord Lock on the assembly. Whenever an adjustment is made on one side of the beater a similar adjustment should be made on the other side as well. The amount of tension you set these springs at is strictly a matter of preference. Generally speaking, the stronger the tension, the harder you will have to pull against these springs during the beat. At the same time, however, it will be easier to hold the beater away from you while opening a shed and throwing the shuttle. You may wish to experiment with these adjustments in order to come up with a setting that works best for you and any particular warp.

K. Locate the Reed Support - the long, thin wooden part with seven holes and a slot similar to the one in the Shuttlerace. Attach the Reed Support to the back of the Shuttlerace with the slot to the top and facing the Shuttlerace, using seven 1/4" x 3" carriage bolts, inserted from the front, with washers and wing nuts behind. Before attaching the nuts, install the bottom edge of your reed in

the void created by the slots in the Reed Support and Shuttlerace. Center the reed between the two Uprights and tighten the wing nuts.

L. There is a slot in the underneath side of the Beater Top which slides over the top of the reed. Push the Beater Top down on the reed and tighten the wing nuts which hold it in place.

M. Take the string tie-up and handle from its bag. As you can see, there are three eyelets coming out of the handle. One at the top and two at the sides. Hold the handle up by the clip attached to the string at the top of the handle. This clip will get attached to the eyelet that is taped to the bottom or side of the Crosspiece. However, the eyelet must first be screwed into the hole on the underside of the Crosspiece. So, first screw the eyelet in so that no screw threads are showing, then attach the clip to it.

At this point, there are two pickers hanging below the handle. Take one of these and orient it so that the leather loop is toward the bottom. Now take it to the very outside of the race on the right side. Slide the picker, with the leather loop down and toward the outside, into the slots between the box sides.

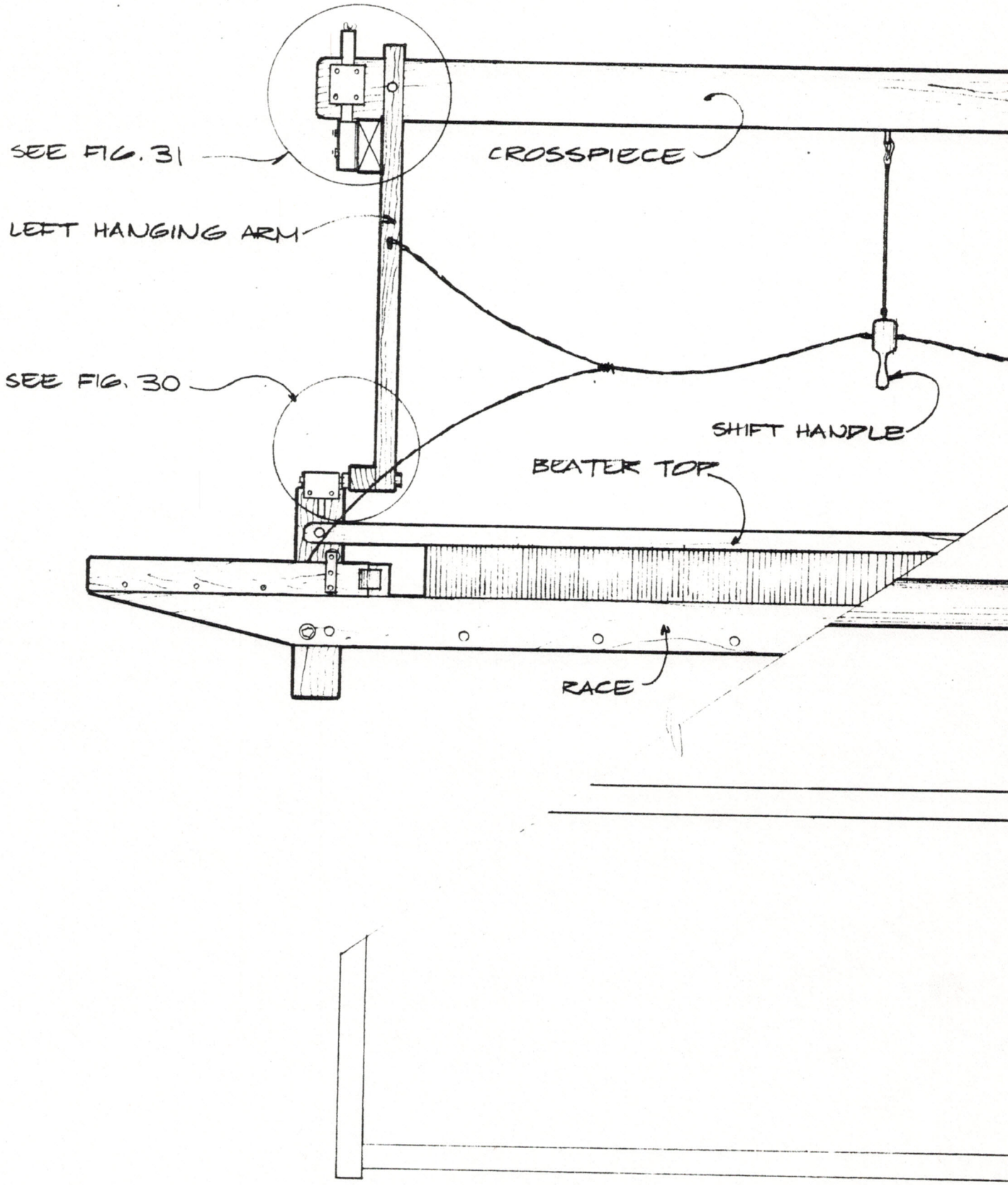
Now look up at the right Hanging Arm. About half-way down there is a screweye on the front face of the arm. The clip at the end of the cord that attaches to the picker should be clipped to the screweye at this point.

Pick up the left picker. With the leather loop down and toward the outside slide it into the grooves in the left box

sides from the very outside of the race. Attach the clip at the end of the cord to the screweye on the left Hanging Arm. Notice that there is a snubber attached to the front box on each side of the race. The cord should go over the snubbers on each side of the loom.

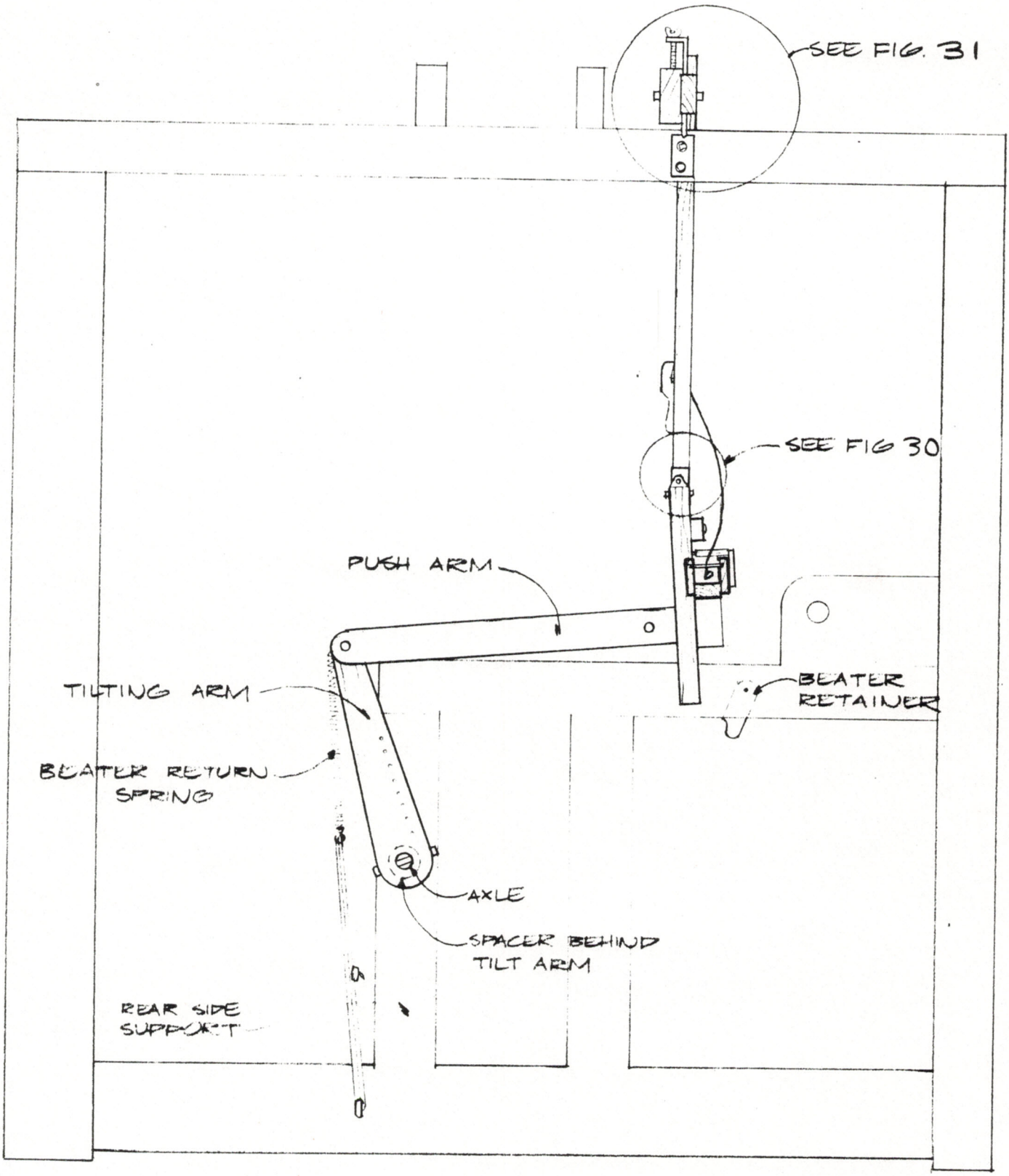
This completes the assembly of your Single Box Flyshuttle Beater.

Check your assembly with figure 33 to be certain you've gotten everything correct.



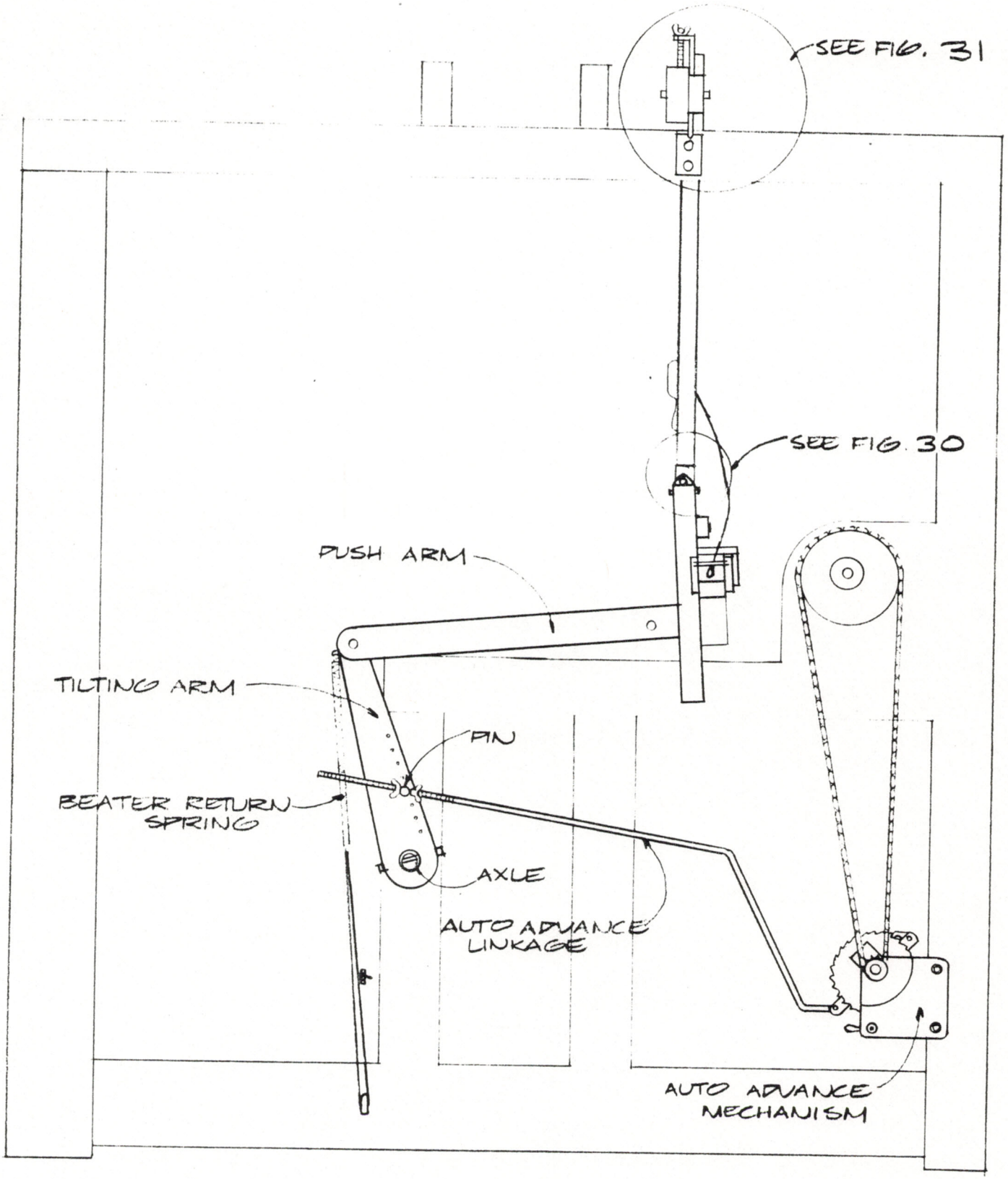
OVERHEAD SINGLE BOX
FLYSHUTTLE BEATER
SHOWN FROM FRONT

FIG. 33



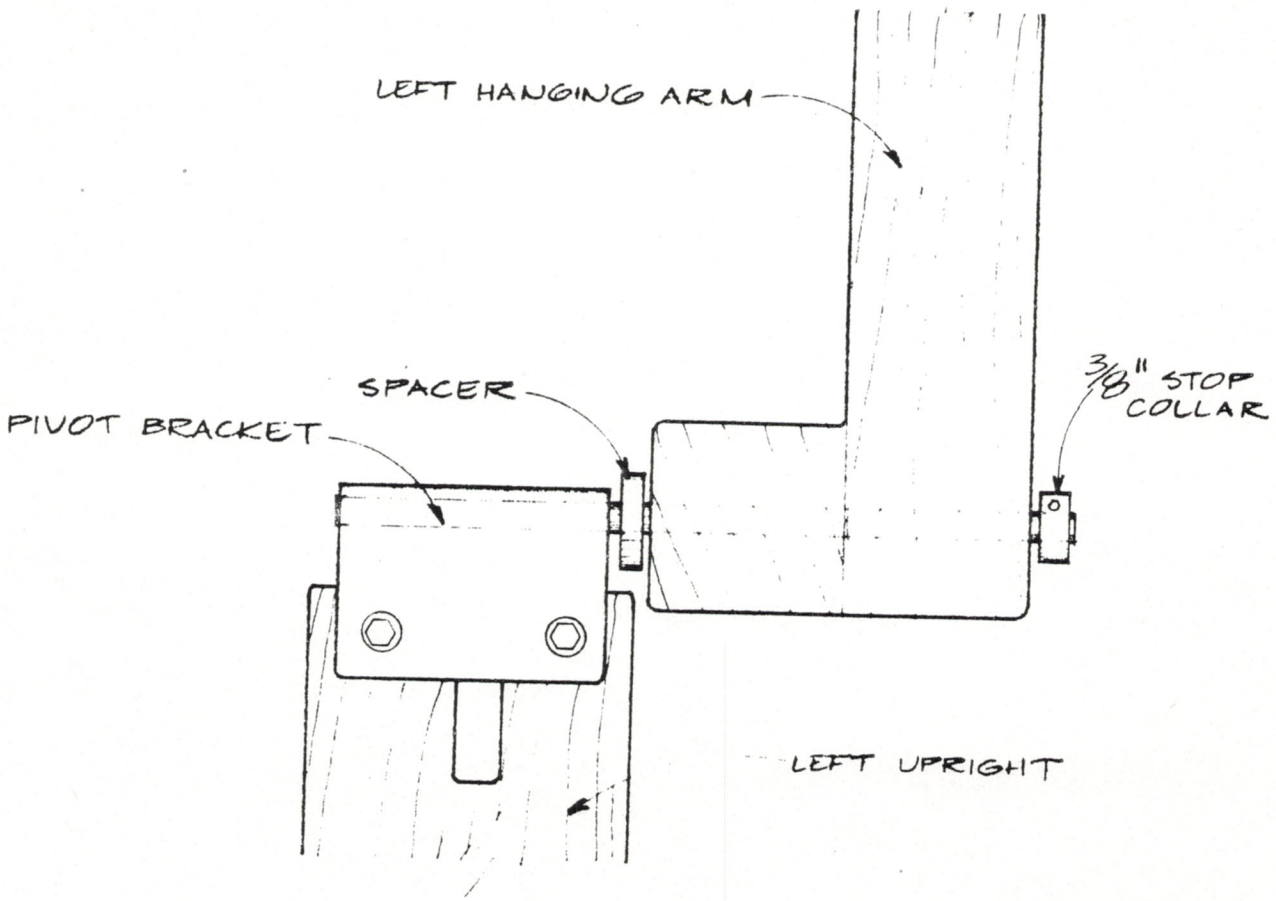
OVERHEAD SINGLE BOX FLYSHUTTLE BEATER
SHOWN FROM LEFT SIDE

FIG. 34



OVERHEAD BEATER WITH AUTO ADVANCE MECHANISM
SHOWN FROM LEFT SIDE

FIG. 35

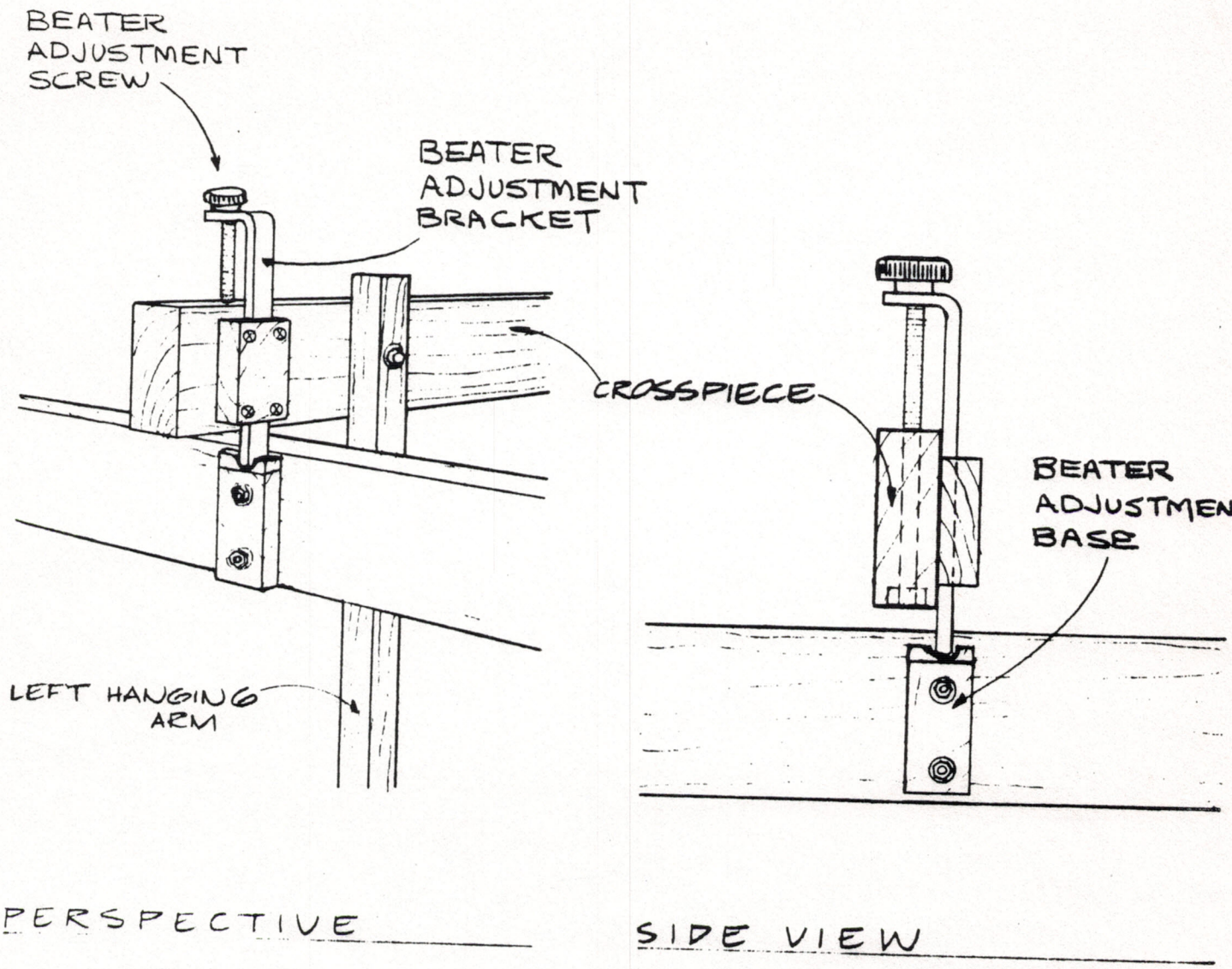


OVERHEAD BEATER

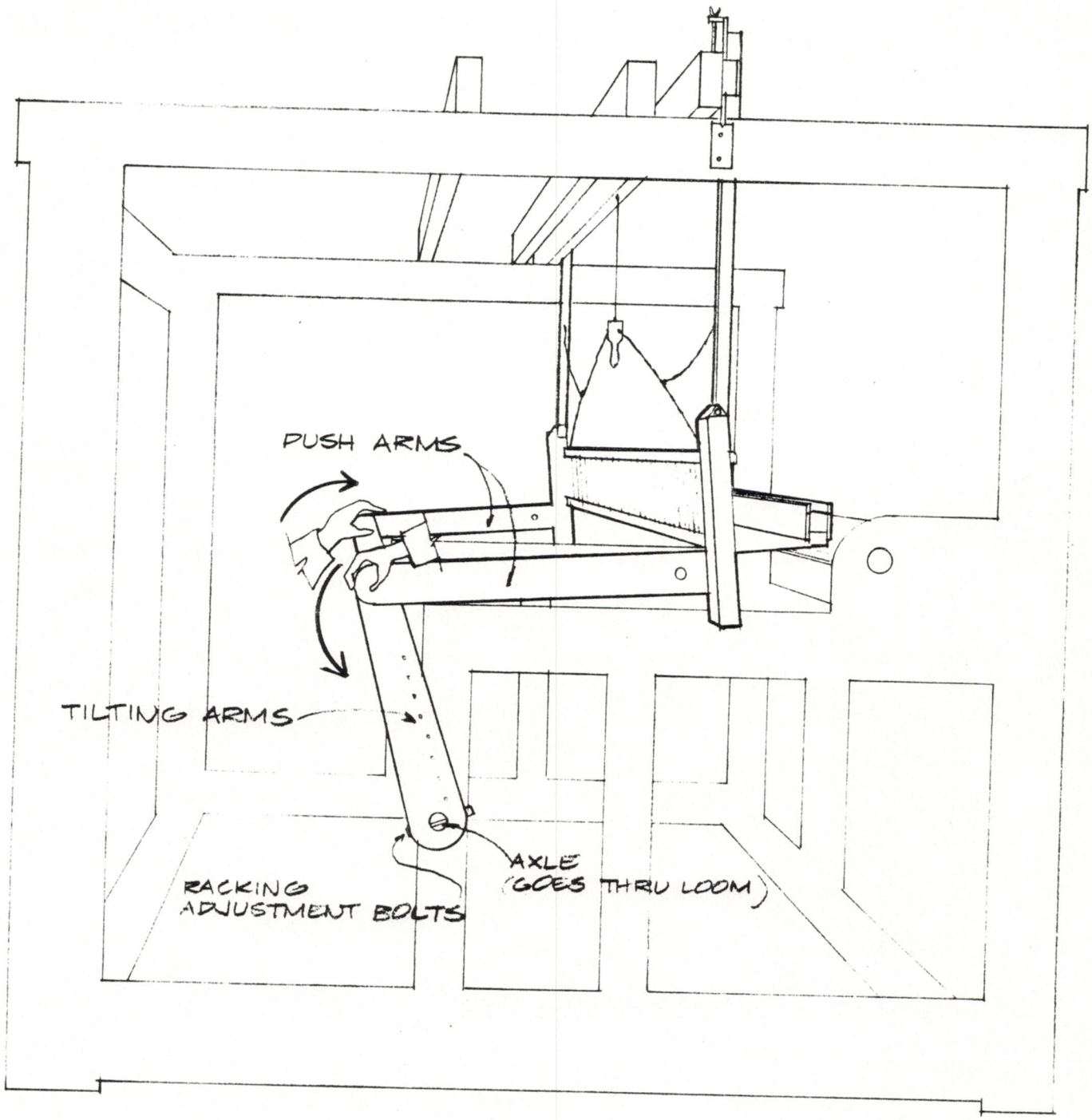
PIVOT BRACKET

SHOWN FROM FRONT

FIG. 30



OVERHEAD BEATER
ADJUSTMENT BRACKET FIG. 31



RACKING POSITION-
OVERHEAD BEATER

FIG. 36

3. Overhead Double Box Flyshuttle Beater (Optional Equipment)

This system is shipped partially disassembled to facilitate packing. Follow the instructions below to complete the assembly. Please refer to figures 30, 31, and 37 through 42 for help with terminology and locations.

A. The first step of this assembly is to mount the Beater Adjustment Bases to the outside face of each Top Horizontal on the assembled side frames of your loom. See figures 38 and 31. Attach these parts using the four 1/4" x 2 1/4" flat head machine screws. Making sure that the metal ends of these parts face upward, insert the screws from the inside of the loom and attach the washers and nuts to the outside of the Beater Adjustment Base. Tighten the four screws securely.

B. Lay the two Uprights on the floor a few feet apart from each other with the tapered edges to the outside and the metal rods at the top of the Uprights should be facing one another. The Uprights are labeled left and right, and it is important that these be properly oriented. Lay the Shuttlerace on top of the two Uprights so that it covers the stamped "L" and "R" designations. There is a groove cut in one side of the Shuttlerace which must be oriented to the top and back of the race which means that it should, for now, be facing down toward the floor. Attach the Shuttlerace to the Uprights with two 5/16" x 3 1/4" carriage bolts, one on each side. You will see that there are two holes on each end of the Shuttlerace that correspond with the two holes on either Upright. For now only the inner-most hole on each end will be used. The outer holes take a different bolt and will be used later. Do not tighten the bolts just yet, as you will be making some adjustments shortly.

C. Temporarily attach the Beater Top to the front of the Uprights with two 1/4" x 2" carriage bolts with washers and wing nuts behind the Uprights. The Beater Top should be attached to the same side of the Uprights as the Shuttlerace, with the Shift Handle on top. This will help in creating proper alignment of the beater parts.

D. Place the beater in the loom. For now it will just sit in the loom resting on top of the Cloth Beam Supports. The assembly may tend to fall forward or backward but don't worry about that. You now have some other assemblies to complete before actually attaching the beater.

E. With the Shuttlerace assembly resting in the loom your next step is to install the Crosspiece assembly. See figure 37. This assembly sits on top of the loom with the two Beater Adjustment Brackets placed into the small grooves on top of the Beater Adjustment Bases that you installed a few minutes ago. The pulleys at the center of the Crosspiece should be facing the front of the loom. No hardware will be necessary to hold the Crosspiece in place.

F. The next step is to mount the Hanging Arms to the Upright on the Shuttlerace assembly (see figures 37 and 30). Using a 1/8" Allen wrench, remove the 3/8" stop collars from the shafts at the tops of each Upright and install the Hanging Arms onto these shafts making sure to put the right and left Hanging Arms in their proper positions. Also be certain to include the small spacer as shown in figure 30. The stop collars are then replaced and tightened making sure to leave enough clearance for this pivot point to swing freely. Now mount the other end (the Top) of the Hanging Arms to the Crosspiece. This is done by lining up the corresponding holes and fastening (loosely for now) with two 5/16" x 2 1/2" hex bolts with washers and hex nuts.

G. The next step is a simple one. Insert the Axle (shown in figures 37 and 38) into the loom. It will go through the large holes in your Rear Side Supports of the side frame assembly. There is no particular right or left orientation for this Axle as it is the same on both ends. After the Axle is inserted place an Axle Spacer on each exposed end of the centered Axle.

H. Now locate the Tilting Arm assemblies (2). They are stamped "L" and "R" and are to be mounted at each end of the Axle as shown in figures 38, 39, and 42. It is important to mount this assembly correctly as shown, with the Push Arms to the outside and the Tilting Arms to the inside. The Tilting Arms are attached to the ends of the Axle with 5/16" x 2 3/4" hex bolts with washers and hex nuts provided. Do not tighten these bolts yet. They will be part of a critical adjustment coming up shortly. You will see a spring/cord/eyebolt assembly hanging from the end of each Tilting Arm. Just let them hang for now. They will be attached later.

I. Next mount each Push Arm to the back face of each Upright (see figure 38) using two 5/16" x 4 1/2" hex bolts, washers, and square nuts. These bolts go through the Shuttlerace and Uprights and end up in a square nut in the nut access hole of each Push Arm. You can go ahead and tighten these bolts making sure that the outer face of each Push Arm is relatively flush with the outer edge of their mating Uprights. This is also a good time to go ahead and tighten the other bolts that we previously told you to leave loose. While tightening these bolts you should see that the beater is relatively square and centered in the loom. The last bolts to tighten are the hex bolts that we shall for now call the "Racking Adjustment Bolts" that

connect the Tilting Arms to the Axle (see figure 42). These bolts should be tightened while the entire beater is being held firmly against the Beater Bumpers - either front or rear, it makes no difference. If you are performing this assembly alone you may hold the beater against the rear Beater Bumper Blocks by using the Beater Retainer that is located on the inside of the left Cloth Beam Support (see figure 38). If the beater won't be held by the Retainer then you will have to raise the beater by adjusting the Beater Adjustment Screws as shown in figure 31. Once raised to a sufficient height the Beater Retainer will hold the Beater Assembly against the Beater Bumper Blocks, leaving you free to tighten the two "Racking Adjustment Bolts" while the beater is in its correct position. If the beater assembly should become out of square, that is if one side of the beater should hit its bumper before the other side, you will have to adjust the Tilting Arms as shown in figure 42. This adjustment is made with the "Racking Adjustment Bolts" loosened and pushing the Tilting Arms accordingly against each other until a good adjustment is achieved, then tighten the bolts. This adjustment is best done with two people.

J. Locate your left Drop Box Assembly: they are marked "L" and "R". You will notice that there are two holes through the Back Plate in the lower right corner and one in the upper right corner with an intersecting hole coming from the right edge. Looking at the left Upright you will find a hole through the width of the Upright just below the slot for the Beater Top. This hole should be offset to the front of the Shuttlerace side of the Upright. Take a 5/16" x 4 1/2" hex bolt with a washer on it, insert it through the hole in the Upright from the inside, through the hole in the edge of the upper right corner of the Drop Box

Assembly and thread it onto a square nut inserted in the nut access hole in the back plate. Do not tighten this yet. Your Drop Box Assembly should now be attached to the Upright with this one bolt, with the movable boxes in the front.

K. Attach the Drop Box Assembly to the Shuttlerace with two 5/16" x 2 3/4" carriage bolts inserted from the front with washers and hex nuts behind the back plate. Now tighten all bolts holding the Drop Box Assembly to the beater. Important--the face of the back plate must be precisely flush with the face of the Upright. Check this alignment by laying a straight edge across the two surfaces.

L. Repeat this procedure for the right Drop Box Assembly.

M. Locate the left Picker Stick Assembly. It is a long narrow stick attached to a shorter, wider arm with a screw eye and spring at one end. Again, they are marked "L" and "R". Standing behind the Drop Box mechanism, hold the picker stick vertically with the spring on the bottom end and toward the loom. Insert it from underneath, between the picker rod and the back plate, through the square hole in the green plastic Picker. With the Picker Stick through the Picker, bolt the Picker Stick Support arm to the back of the Upright with two 1/4" x 2 1/4" carriage bolts inserted from the front with washers and hex nuts behind. Make sure that the Support Arm is precisely perpendicular to the Upright and tighten the nuts. Check to insure that the Picker Stick moves throughout its range with no binding at the Picker. You may have to adjust the relationship of the Support Arm to the Upright.

N. Hook the loose end of the Picker Return Spring to the screw eye located on the Upright just below the Support Arm.

O. Repeat these three operations with the right Picker Stick assembly.

P. Locate the Flyshuttle Handle and tie-up which came packed in the box with the Shuttlerace. It consists of a wooden handle, four sets of pulleys, and attached cords with an eyebolt and hex nuts at each end.

Standing in front of the left Drop Box Assembly, pick up one of the sets of multiplier pulleys. These are the ones that are made of two different size pulleys. Hold it so that the larger pulley is away from you. Starting with both cords at the top of the pulleys, run the short cord (with eyebolt attached) off to the left of the larger pulley. Now wrap the other cord two times around the smaller pulley starting from the top in a clockwise direction. Figure 40 will be helpful if this part sounds a bit confusing. With the cords situated in this manner place the pulley assembly on the small axle that is sticking out of the front face of the left Hanging Arm (see figure 37). Secure this pulley assembly to the axle by tapping a 3/8" axle cap on the end of the axle.

The next step is to take the cord that is attached to the smaller of the two pulleys that you just mounted, and following this cord to its other end you will notice that it is attached to a double pulley in your left hand, situated so that the cord that goes to the multiplier pulley is facing you and the knot hole is roughly in the 9 o'clock position. Now take the cord that is attached to the rear

groove of the pulley and wrap it in a clockwise direction one time around that rear groove. Now place this double pulley on the axle provided on the Crosspiece just to the right of the Hanging Arm (see figure 41). Secure this pulley to the axle by tapping a 3/8" axle cap on the end of the axle.

Now take the 2" eyebolt that is hanging from the larger pulley cord and insert it, starting from the front of the loom, through the hole on the top end of the Picker Stick with a regular hex nut on the front and the locknut on the back of the picker stick. Tighten the locknut while holding the eyebolt. Ideally the eyebolt should be situated so that it is in line with the Picker Stick, or that it looks like a circle when viewed from the end of the Picker Stick.

Q. Repeat the above procedures on the right side of the loom so that it is symmetrical with the left side. The only difference will be that when you wrap the cord around the pulleys they will be in a <u>counterclockwise</u> direction.

R. Now there should be a cord that goes across the loom from one double pulley to the other. Grasp this cord near the center, form a small loop, and bring it up to the brass Keeper located at the center of the Crosspiece just below the two center pulleys. Feed this loop through the Keeper from <u>above</u> the Keeper. Route the cord over the top of the two center pulleys, placing one cord over the left pulley and one cord over the right. Pull the center part of the cord down over the right. Pull the center part of the cord down through the Keeper to take up the slack on the tie-up.

Locate the Flyshuttle Handle. It is a small piece of wood with a hole and a brass pin through the center of it. Once again, form a tight loop at the center of the cord. Feed the loop down from the top of the handle through the hole on either side of the brass pin that divides the hole. Now feed the loop back through the hole on the other side of the brass pin. Now form a larger loop (6" or so) and run it back over either end of the handle. To do this you actually put the handle through this loop and bring the string of the loop all the way back up to the top of the handle. Now pull straight down on the handle, tightening the cord around the brass pin. This procedure should automatically center the handle on the tie-up.

S. Next attach the Flystring Retainer to the top of the Crosspiece with the two #8 x 1" screws provided. This part will help keep the tie-up cords on the pulleys. The felt should just touch the top of the pulleys.

T. Now you are going to have to tie an overhead knot in the cord between the two center pulleys (see figure 37). To do this, make a small mark on the cord and pull it straight down a few inches to where you can tie a simple overhead knot with the handle already in place. Once the knot is tied, release the cord and let it return to its resting position. If the knot was placed correctly the green pickers should still return to the end of the picker rod at each end of the beater and the cord should stop before the knot hits the felt covered wedge above the two center pulleys of the crosspiece.

U. Now is a good time to attach the Beater Return Spring assembly. This is the previously mentioned spring/cord/eyebolt assembly that hangs from each of the

Tilting Arms. To attach this assembly simply remove one hex nut and washer from the eyebolt and place the eyebolt through the hole provided on each Bottom Horizontal of the side frame assembly. (See figure 38.) The eye of the bolt should be to the outside of the side frame and as close to the side frame as possible. Replace the washer and hex nut and tighten securely.

This assembly is used to assist the weaver in returning the beater to the back position. It is not necessarily intended to hold the beater in this position, as that is the purpose of the Beater Retainer.

The Beater Return Spring assembly is adjustable. It is tightened by pulling on the ends of the white cord while squeezing the black Mini Cord Lock on the assembly. Whenever an adjustment is made on one side of the beater a similar adjustment should be made on the other side as well. The amount of tension you set these springs at is strictly a matter of preference. Generally speaking, the stronger the tension, the harder you will have to pull against these springs during the beat. At the same time, however, it will be easier to hold the beater away from you while opening a shed and throwing the shuttle. You may wish to experiment with these adjustments in order to come up with a setting that works best for you and any particular warp.

V. Locate the Reed Support - the long, thin wooden part with seven holes and a slot similar to the one in the Shuttlerace. Attach the Reed Support to the back of the Shuttlerace with the slot to the top and facing the Shuttlerace, using seven 1/4" x 3" carriage bolts, inserted from the front with washers and wing nuts behind. Before

attaching the nuts, install the bottom edge of your reed in the void created by the slots in the Reed Support and Shuttlerace. Center the reed between the two Uprights and tighten the wing nuts.

W. There is a slot in the underneath side of the Beater Top which slides over the top edge of the reed. Push the Beater Top down on the reed and tighten the wing nuts which hold it in place.

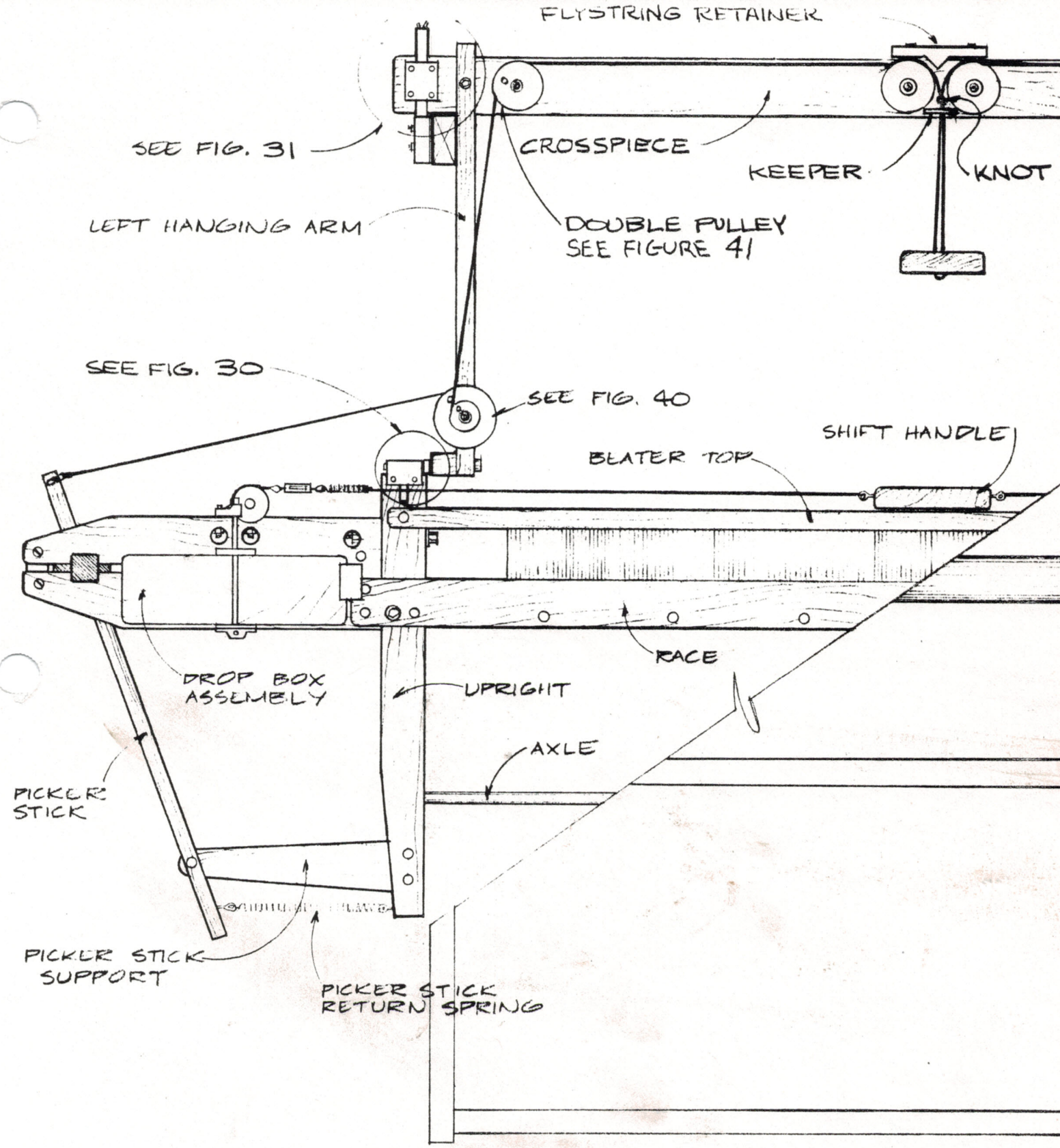
X. The next thing is to adjust the movement of the drop boxes themselves. You will notice that the boxes slide up and down on a metal rod which is fixed at both ends to cast metal pieces. In each of these cast metal pieces you will find a brass adjustment screw with a locknut. These brass screws provide a stop for the boxes at their upper and lower extremes of movement. Adjust the top screw so that when the boxes are all the way up, the lower box is in precise alignment with the Shuttlerace. Adjust the bottom screw so that when the boxes are all the way down, the upper box is in precise alignment with the Shuttlerace. <u>This adjustment is critical</u>, please make it carefully. It is wise to lay a straight edge across the Shuttlerace and drop box when doing this to assist you in getting the two perfectly aligned. When you have it properly adjusted, secure the locknuts on the brass screws. Do these adjustments on both the left and right drop boxes. If your shuttle flight is erratic, recheck these adjustments.

Y. The final step is to attach the drop boxes to the Shift Handle and adjust the cable lengths. On each side, there is a cable attached to the drop box which has an eyebolt on the end. This cable is routed over the top of the Drop Box Pulley and the eyebolt threads into the turnbuckle on

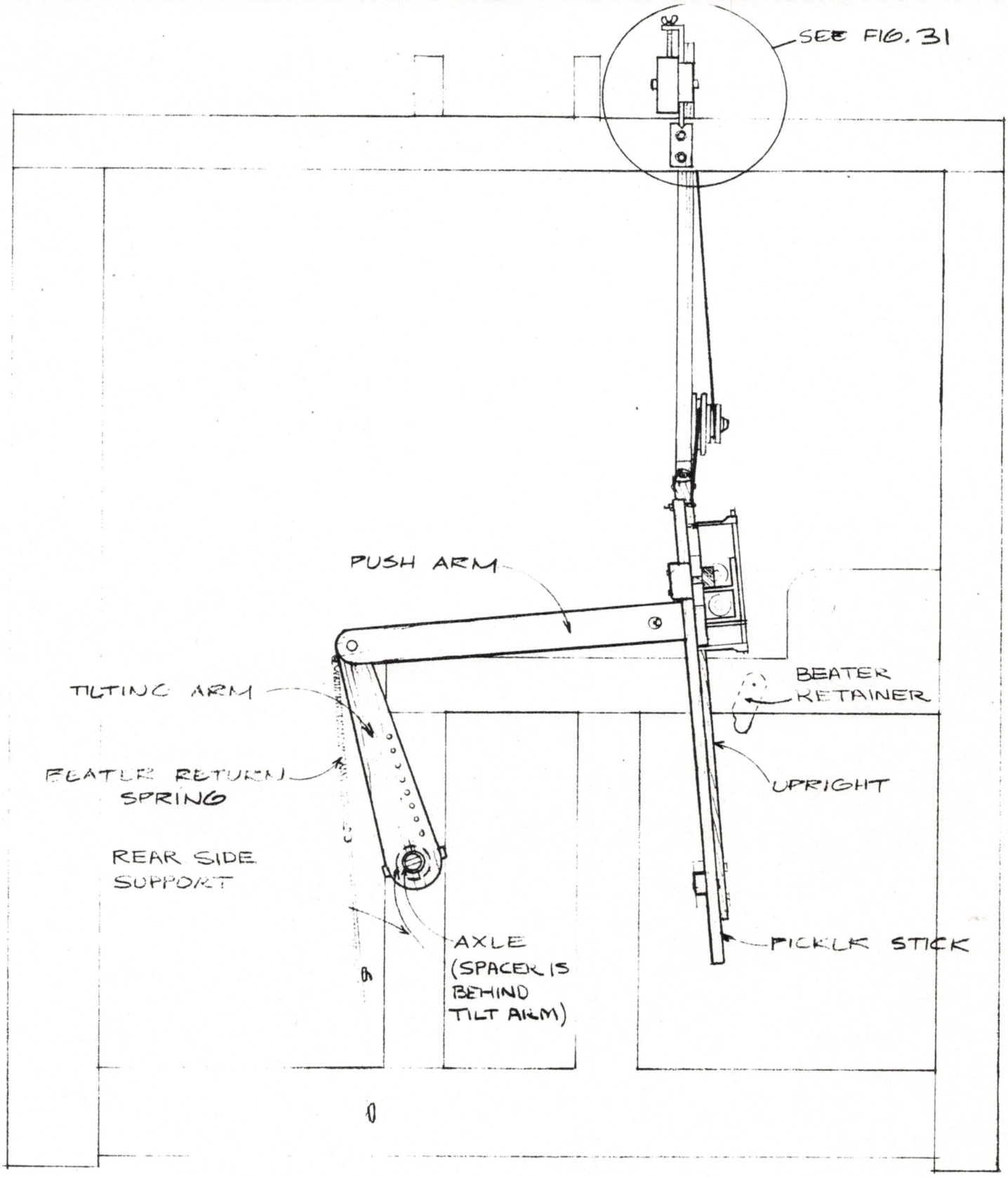
the end of the cable coming from the Shift Handle. Once you have both sides attached, they are adjusted as follows: with the Shift Handle shifted to its rightmost, adjust the left Drop Box turnbuckle so that the box is against its top stop and the spring at the turnbuckle is slightly extended. Shift the handle to the left and adjust the right turnbuckle in the same manner. **Attention**! When shifting, the leading end of the handle must be raised first. If the trailing end of the handle is lifted first, the handle will lock up and not shift. Also, you want to make sure that the turnbuckles are not adjusted so tightly as to not allow the boxes to drop to their full down position. Once properly adjusted, tighten the locknut of each turnbuckle to keep them from moving.

That completes the assembly of your double box flyshuttle beater.

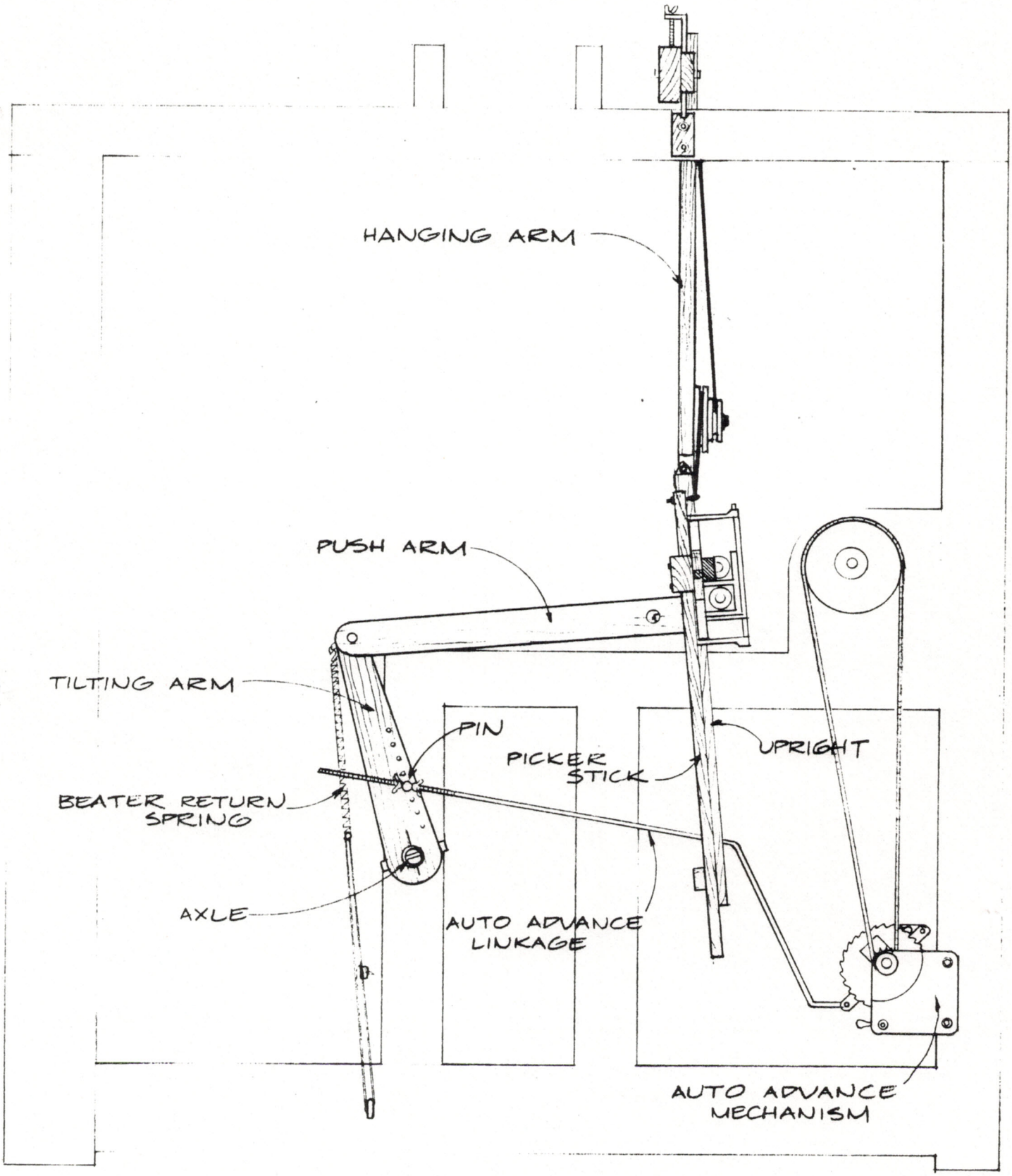
Check your assembly with figure 37 to be certain you've gotten everything correct.



OVERHEAD
DOUBLE BOX FLYSHUTTLE BEATER FIG. 37
SHOWN FROM FRONT

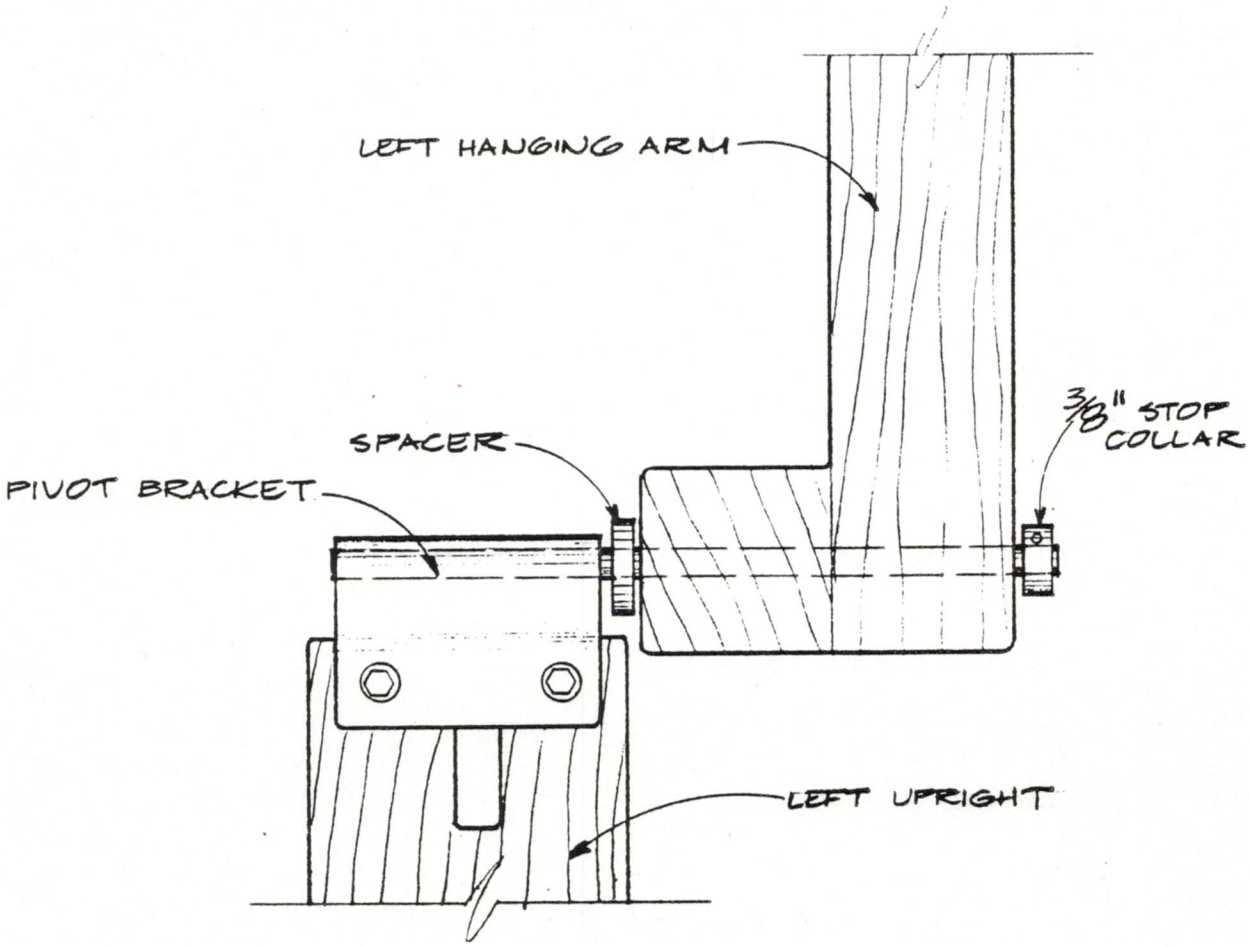


OVERHEAD
DOUBLE BOX FLYSHUTTLE BEATER FIG. 38
SHOWN FROM LEFT SIDE



OVERHEAD BEATER WITH AUTO ADVANCE MECHANISM SHOWN FROM LEFT SIDE

FIG. 39

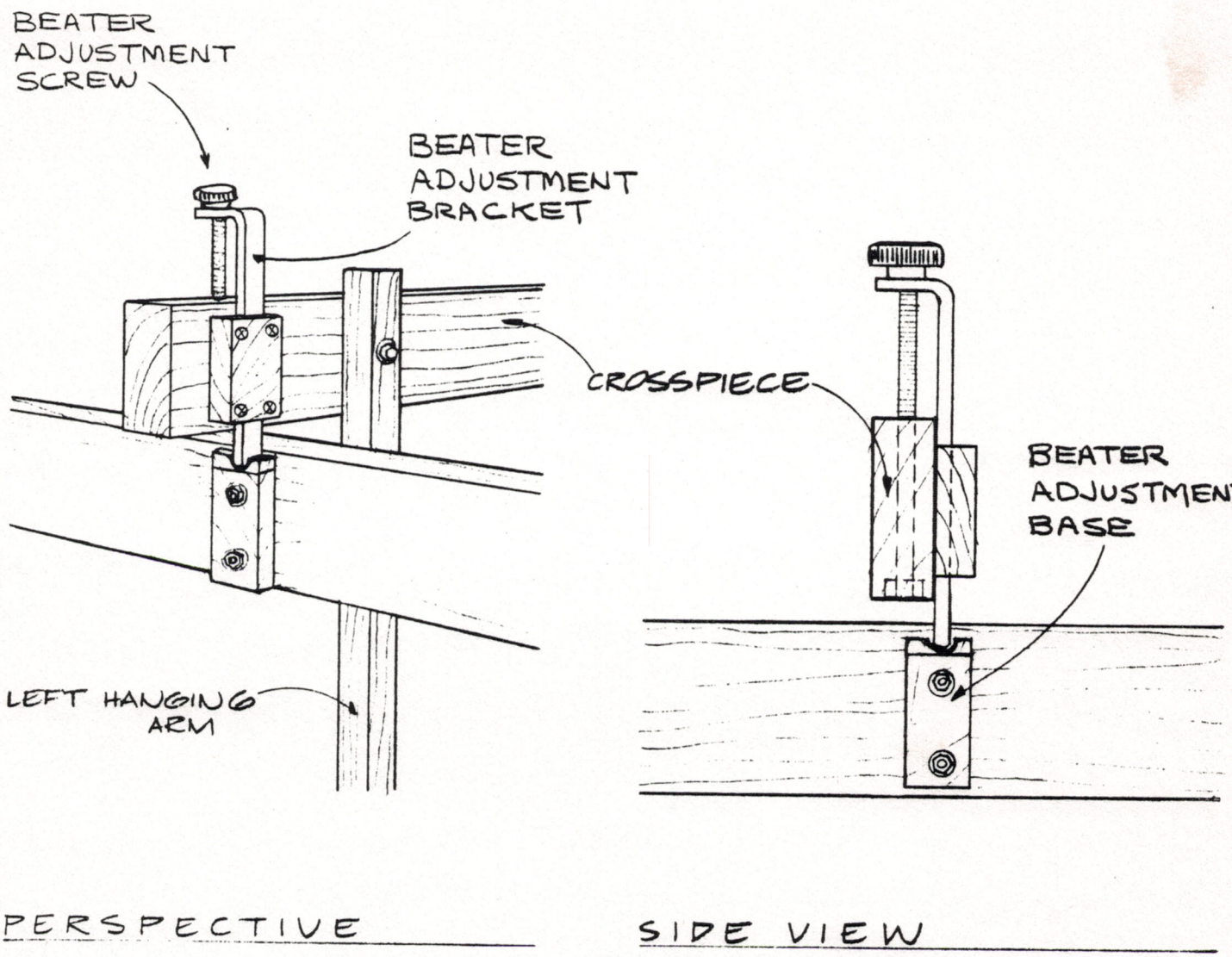


OVERHEAD BEATER

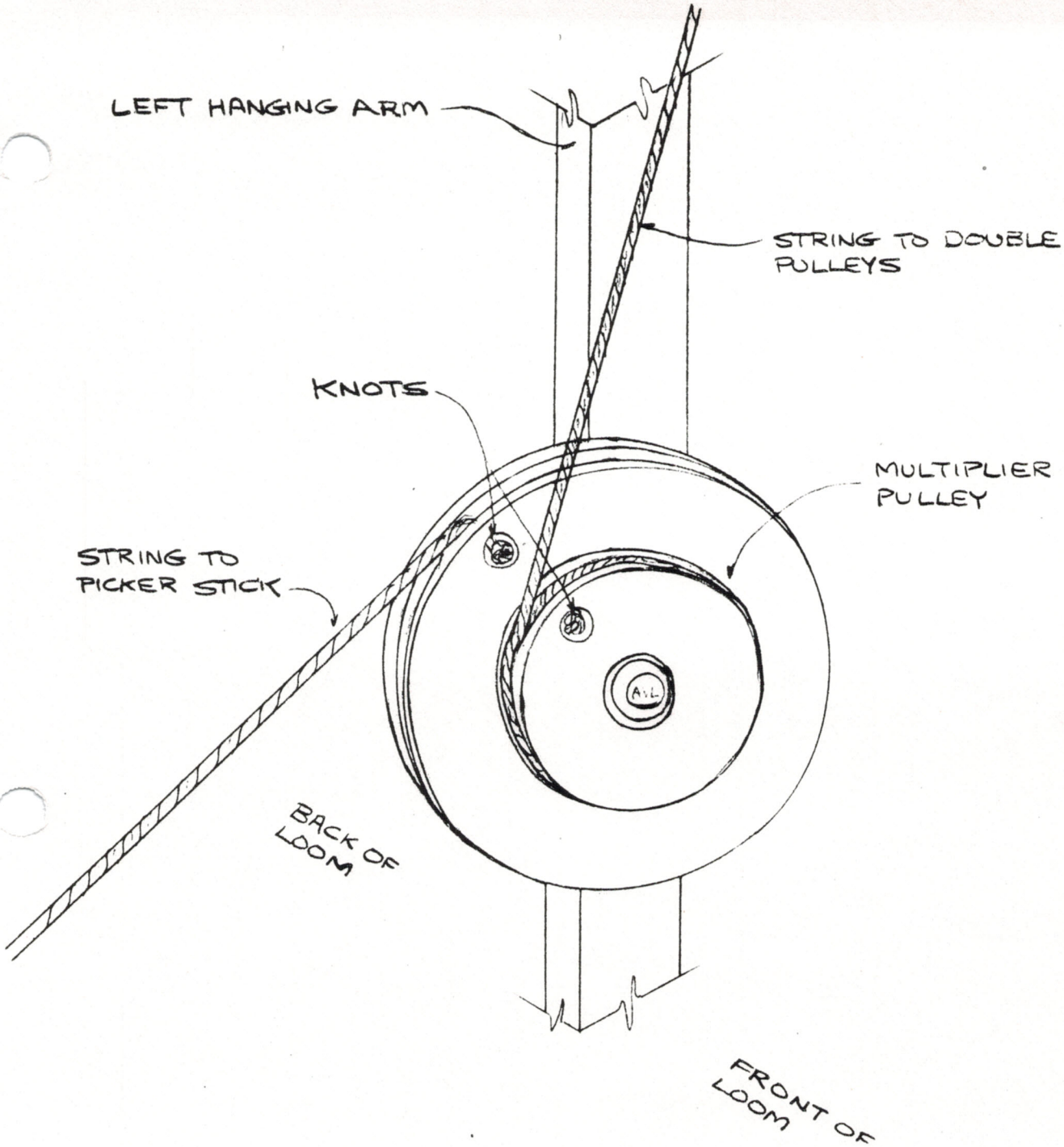
PIVOT BRACKET

SHOWN FROM FRONT

FIG. 30

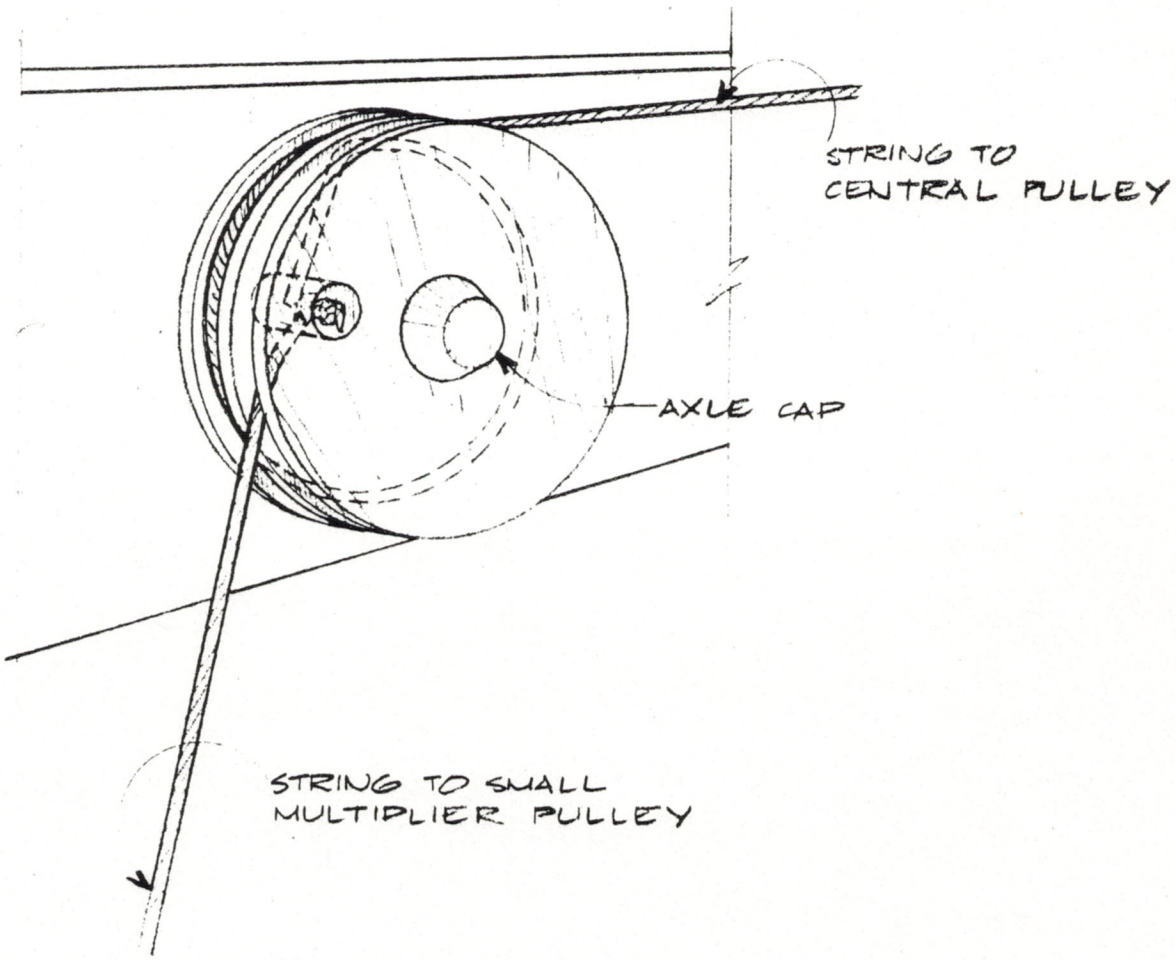


OVERHEAD BEATER
ADJUSTMENT BRACKET FIG. 31



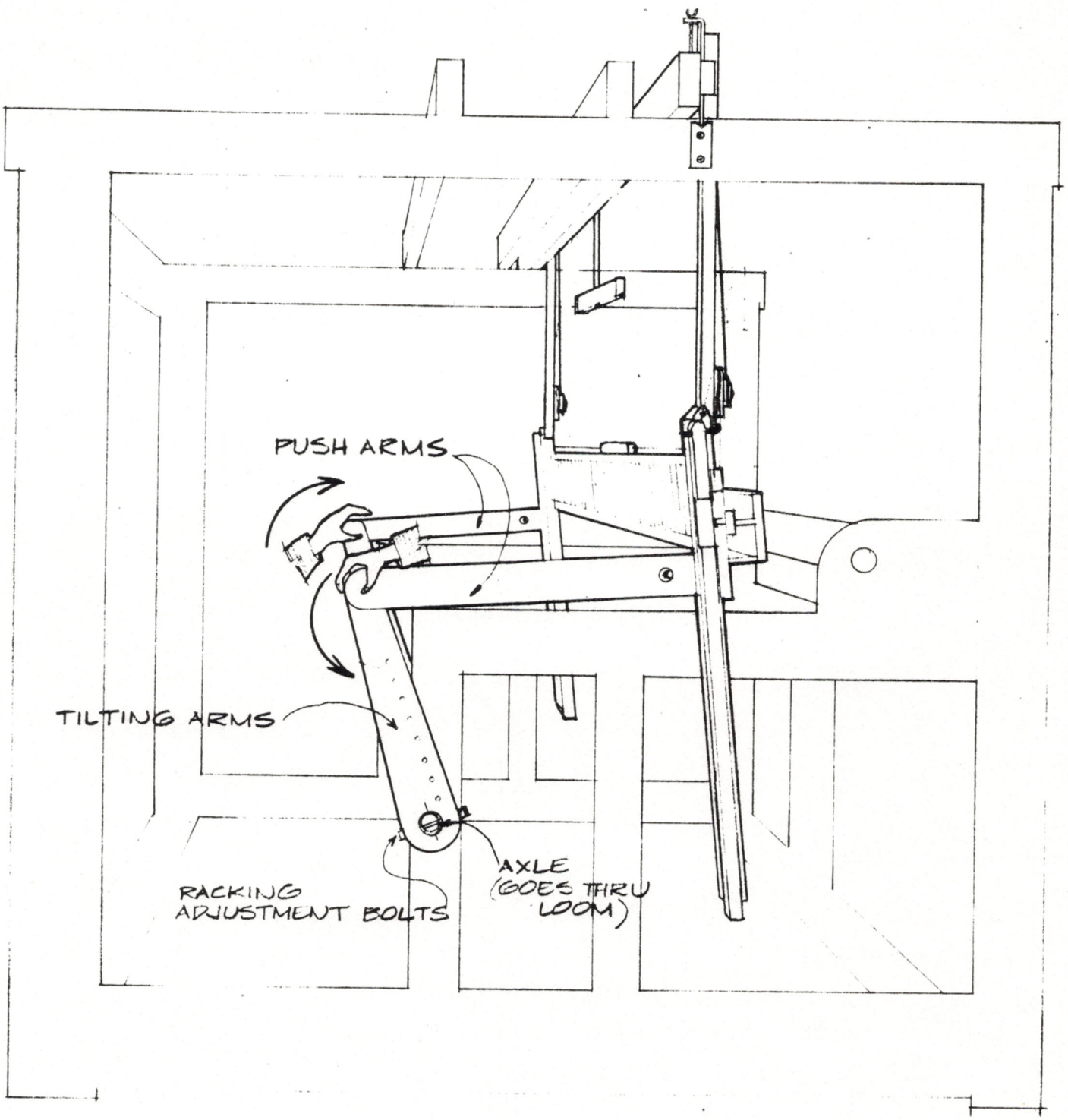
MULTIPLIER PULLEY

FIG. 40



DOUBLE PULLEY

FIG 41



RACKING POSITION
OVERHEAD BEATER

FIG. 42

4. Overhead Four Box Flyshuttle Beater (Optional Equipment).

This system is shipped partially disassembled to facilitate packing. Follow the instructions below to complete the assembly. Please refer to figures 30, 31, 40, 41, and 43 through 48 for help with terminology and locations.

A. The first step of this assembly is to mount the Beater Adjustment Bases to the outside face of each Top Horizontal on the assembled side frames of your loom. See figures 44 and 31. Attach these parts using the four 1/4" x 2 1/4" flat head machine screws. Making sure that the metal ends of these parts face upward, insert the screws from the inside of the loom and attach the washers and nuts to the outside of the Beater Adjustment Base. Tighten the four screws securely.

B. Lay the two Uprights on the floor a few feet apart from each other with the tapered edges to the outside and the metal rods at the top of the Uprights should be facing one another. The Uprights are labeled left and right, and it is important that these be properly oriented. Lay the Shuttlerace on top of the two Uprights so that it covers the stamped "L" and "R" designations. There is a groove cut in one side to the Shuttlerace which must be oriented to the top and back of the race which means that it should, for now, be facing down toward the floor. Attach the Shuttlerace to the Uprights with two 5/16" x 3 1/4" carriage bolts, one on each side. You will see that there are two holes on each end of the Shuttlerace that correspond with the two holes on either Upright. For now only the inner-most hole on each end will be used. The outer holes take a different bolt and will be used later. Do not tighten the bolts just yet, as you will be making some adjustments shortly.

C. Temporarily attach the Beater Top to the front of the Uprights with two 1/4" x 2" carriage bolts with washers and wing nuts behind the Uprights. The Beater Top should be attached to the same side of the Uprights as the Shuttlerace with the Shift Handle on top. This will help in creating proper alignment of the beater parts.

D. Place the beater in the loom. For now it will just sit in the loom resting on top of the Cloth Beam Supports. The assembly may tend to fall forward or backward but don't worry about that. You now have some other assemblies to complete before actually attaching the beater.

E. With the Shuttlerace assembly resting in the loom your next step is to install the Crosspiece assembly. See figure 43. This assembly sits on top of the loom with the two Beater Adjustment Brackets placed into the small grooves on top of the Beater Adjustment Bases that you installed a few minutes ago. The pulleys along the face of the Crosspiece should be facing the front of the loom. No hardware will be necessary to hold the Crosspiece in place.

F. The next step is to mount the Hanging Arms to the Upright on the Shuttlerace assembly (see figures 43 and 30). Using a 1/8" Allen wrench, remove the 3/8" stop collars from the shafts at the tops of each Upright and install the Hanging Arms onto these shafts making sure to put the right and left Hanging Arms in their proper positions. Also be certain to include the small spacer as shown in figure 30. The stop collars are then replaced and tightened making sure to leave enough clearance for this pivot point to swing freely. Now mount the other end (the Top) of the Hanging Arms to the Crosspiece. This is done by lining up the corresponding holes and fastening (loosely for now) with two 5/16" x 2 1/2" hex bolts with washers and hex nuts.

G. The next step is a simple one. Insert the Axle (shown in figures 43 and 44) into the loom. It will go through the large holes in your Rear Side Supports of the side frame assembly. There is no particular right or left orientation for this Axle as it is the same on both ends. After the Axle is inserted place an Axle Spacer on each exposed end of the centered Axle.

H. Now locate the Tilting Arm assemblies (2). They are stamped "L" and "R" and are to be mounted at each end of the Axle as shown in figures 43, 44, and 46. It is important to mount this assembly correctly as shown, with the Push Arms to the outside and the Tilting Arms to the inside. The Tilting Arms are attached to the ends of the Axle with 5/16" x 2 3/4" hex bolts with washers and hex nuts provided. Do not tighten these bolts yet. They will be part of a critical adjustment coming up shortly. You will see a spring/cord/eyebolt assembly hanging from the end of each Tilting Arm. Just let them hang for now. They will be attached later.

I. Next mount each Push Arm to the back face of each Upright (see figure 44) using two 5/16" x 4 1/2" hex bolts, washers, and square nuts. These bolts go through the Shuttlerace and Uprights and end up in a square nut in the nut access hole of each Push Arm. You can go ahead and tighten these bolts making sure that the outer face of each Push Arm is relatively flush with the outer edge of their mating Uprights. This is also a good time to go ahead and tighten the other bolts that we previously told you to leave loose. While tightening these bolts you should see that the beater is relatively square and centered in the loom. The last bolts to tighten are the hex bolts that we shall for now call the "Racking Adjustment Bolts" that connect the Tilting Arms to the Axle (see figure 46).

These bolts should be tightened while the entire beater is being held firmly against the Beater Bumpers - either front or rear, it makes no difference. If you are performing this assembly alone you may hold the beater against the rear Beater Bumper Blocks by using the Beater Retainer that is located on the inside of the left Cloth Beam Support (see figure 44). If the beater won't be held by the Retainer then you will have to raise the beater by adjusting the Beater Adjustment Screws as shown in figure 31. Once raised to a sufficient height the Beater Retainer will hold the Beater Assembly against the Beater Bumper Blocks, leaving you free to tighten the two "Racking Adjustment Bolts" while the beater is in its correct position. If the beater assembly should become out of square, that is if one side of the beater should hit its bumper before the other side, you will have to adjust the Tilting Arms as shown in figure 46. This adjustment is made with the "Racking Adjustment Bolts" loosened and pushing the Tilting Arms accordingly against each other until a good adjustment is achieved, then tighten the bolts. This adjustment is best done with two people.

J. Locate your left Drop Box Assembly; they are marked "L" and "R". You will notice that there are two holes through the Back Plate near the inner edge of the assembly, one larger hole above that is partially covered by one of the metal shuttle retainers with an intersecting hole coming from the edge. Looking at the left Upright just below the slot for the Beater Top you will notice a hole. This hole should be offset to the front of the Shuttlerace side of the Upright. Take a 5/16" x 4 1/2" hex bolt with a washer on it, insert it through the hole in the Upright from the inside, through the hole in the inner edge of the Drop Box Assembly and thread it onto a square nut inserted in the nut access hole in the back plate. Do not tighten this

yet. Your Drop Box Assembly should now be attached to the Upright with this one bolt, with the movable boxes in the front.

K. Attach the Drop Box Assembly to the Shuttlerace with two 5/16" x 2 3/4" carriage bolts inserted from the front with washers and hex nuts behind the back plate. Now tighten all bolts holding the Drop Box Assembly to the beater. Important--the face of the back plate must be precisely flush with the face of the Upright. Check this alignment by laying a straight edge across the two surfaces.

L. Repeat this procedure for the right Drop Box Assembly.

M. Locate the left Picker Stick Assembly. It is a long narrow stick attached to a shorter, wider arm with a screw eye and spring at one end. Again, they are marked "L" and "R". Standing behind the Drop Box mechanism, hold the picker stick vertically with the spring on the bottom end and toward the loom. Insert it from underneath, between the picker rod and the back plate, through the square hole in the green plastic Picker. With the Picker Stick through the Picker, bolt the Picker Stick Support arm to the back of the Upright with two 1/4" x 2 1/4" carriage bolts inserted from the front with washers and hex nuts behind. Make sure that the Support Arm is precisely perpendicular to the Upright and tighten the nuts. Check to insure that the Picker Stick moves throughout its range with no binding at the Picker. You may have to adjust the relationship of the Support Arm to the Upright.

N. Hook the loose end of the Picker Return Spring to the screw eye located on the Upright just below the Support Arm.

O. Repeat these three operations with the right Picker Stick assembly.

P. Locate the Flyshuttle Handle and tie-up which came packed in the box with the Shuttlerace. It consists of a wooden handle, four sets of pulleys, and attached cords with an eyebolt and hex nuts at each end.

Standing in front of the left Drop Box Assembly, pick up one of the sets of multiplier pulleys. These are the ones that are made of two different size pulleys. Hold it so that the larger pulley is away from you. Starting with both cords at the top of the pulleys, run the short cord (with eyebolt attached) off to the left of the larger pulley. Now wrap the other cord two times around the smaller pulley starting from the top in a clockwise direction. Figure 40 will be helpful if this part sounds a bit confusing. With the cords situated in this manner place the pulley assembly on the small axle that is sticking out of the front face of the left Hanging Arm (see figure 43). Secure this pulley assembly to the axle by tapping a 3/8" axle cap on the end of the axle.

The next step is to take the cord that is attached to the smaller of the two pulleys that you just mounted, and following this cord to its other end you will notice that it is attached to a double pulley (one with two grooves). Hold this double pulley in your left hand, situated so that the cord that goes to the multiplier pulley is facing you and the knot hole is roughly in the 9 o'clock position. Now take the cord that is attached to the rear groove of the pulley and wrap it in a clockwise direction one time around that rear groove see figure 41. Now place this

double pulley on the axle provided on the Crosspiece just to the right of the Hanging Arm (see figure 43). Secure this pulley to the axle by tapping a 3/8" axle cap on the end of the axle.

Now take the 2" eyebolt that is hanging from the larger pulley cord and insert it, starting from the front of the loom, through the hole on the top end of the Picker Stick with a regular hex nut on the front and the locknut on the back of the picker stick. Tighten the locknut while holding the eyebolt. Ideally the eyebolt should be situated so that it is in line with the Picker Stick, or that it looks like a circle when viewed from the end of the Picker Stick.

Q. Repeat the above procedures on the right side of the loom so that it is symmetrical with the left side. The only difference will be that when you wrap the cord around the pulleys they will be in a <u>counterclockwise</u> direction.

R. Now there should be a cord that goes across the loom from one double pulley to the other. Grasp this cord near the center, form a small loop, and bring it up to the brass Keeper located at the center of the Crosspiece just below the two center pulleys. Feed this loop through the Keeper from <u>above</u> the Keeper. Route the cord over the top of the two center pulleys, placing one cord over the left pulley and one cord over the right. Pull the center part of the cord down through the Keeper to take up the slack on the tie-up.

Locate the Flyshuttle Handle. It is a small piece of wood with a hole and a brass pin through the center of it. Once again, form a tight loop at the center of the cord.

Feed the loop down from the top of the handle through the hole on either side of the brass pin that divides the hole. Now feed the loop back through the hole on the other side of the brass pin. Now form a larger loop (6" or so) and run it back over either end of the handle. To do this you actually put the handle through this loop and bring the string of the loop all the way back up to the top of the handle. Now pull straight down on the handle, tightening the cord around the brass pin. This procedure should automatically center the handle on the tie-up.

S. Next attach the Flystring Retainer to the top of the Crosspiece with the two #8 x 1" screws provided. This part will help keep the tie-up cords on the pulleys. The felt should just touch the top of the pulleys.

T. Now you are going to have to tie an overhand knot in the cord between the two center pulleys (see figure 43). To do this, make a small mark on the cord and pull it straight down a few inches to where you can tie a simple OVERHAND knot with the handle already in place. Once the knot is tied, release the cord and let it return to its resting position. If the knot was placed correctly the green pickers should still return to the end of the picker rod at each end of the beater and the cord should stop before the knot hits the felt covered wedge above the two center pulleys of the crosspiece.

U. Now is a good time to attach the Beater Return Spring assembly. This is the previously mentioned spring/cord/eyebolt assembly that hangs from each of the Tilting Arms. To attach this assembly simply remove one hex nut and washer from the eyebolt and place the eyebolt through the hole provided on each Bottom Horizontal of the

side frame assembly. (See figure 44) The eye of the bolt should be to the outside of the side frame. Replace the washer and hex nut and tighten securely.

This assembly is used to assist the weaver in returning the beater to the back position. It is not necessarily intended to hold the beater in this position, as that is the purpose of the Beater Retainer.

The Beater Return Spring assembly is adjustable. It is tightened by pulling on the ends of the white cord while squeezing the black Mini Cord Lock on the assembly. Whenever an adjustment is made on one side of the beater a similar adjustment should be made on the other side as well. The amount of tension you set these springs at is strictly a matter of preference. Generally speaking, the stronger the tension, the harder you will have to pull against these springs during the beat. At the same time, however, it will be easier to hold the beater away from you while opening a shed and throwing the shuttle. You may wish to experiment with these adjustments in order to come up with a setting that works best for you and any particular warp.

V. Locate the Reed Support - the long, thin wooden part with seven holes and a slot similar to the one in the Shuttlerace. Attach the Reed Support to the back of the Shuttlerace with the slot to the top and facing the Shuttlerace, using seven 1/4" x 3" carriage bolts, inserted from the front, with washers and wing nuts behind. Before attaching the nuts, install the bottom edge of your reed in the void created by the slots in the Reed Support and Shuttlerace. Center the reed between the two Uprights and tighten the wing nuts.

W. There is a slot in the underneath side of the Beater Top which slides over the top edge of the reed. Push the Beater Top down on the reed and tighten the wing nuts which hold it in place.

The dark wooden handle located at the top and center of the Beater Top is the Shift Handle. By moving this handle laterally you will be able to shift from one shuttle box to another, but first you will have to attach the handle to both sets of boxes. This is accomplished by unwrapping the cable that is attached to each end of the Shift Handle and running each cable over to its respective Drop Box assembly. At the end of the cable you will find a steel ball and shank. To attach the cable you will need to insert this balled end of the cable into the slot provided in the cast metal piece located at the top and center of the drop box. (It is the piece that the vertical steel rod goes through.) Insert the ball end of the cable into the large end of the slot and slide the cable to the other end of the slot and then pull straight up on the cable (see figure 48). This is done so that the ball will be seated into a small opening that has been machined for it on the bottom of the plate. Once the cable is attached to the Drop Box assembly you can run the cable <u>over</u> the Drop Box Pulley that is located on the larger cast metal piece directly above the Drop Box assembly. Also make sure that the pulley runs <u>under</u> the small pulley that is attached near the end of the Beater Top (see figure 43). Repeat this procedure on the other side of the loom. You may find it handy to use the following trick when attaching or adjusting the Drop Box Cable: to give yourself some slack in the cable it may be helpful to raise the Drop Box on the side you are working on to its upper-most position. To hold it in this position you can insert one of your shuttles

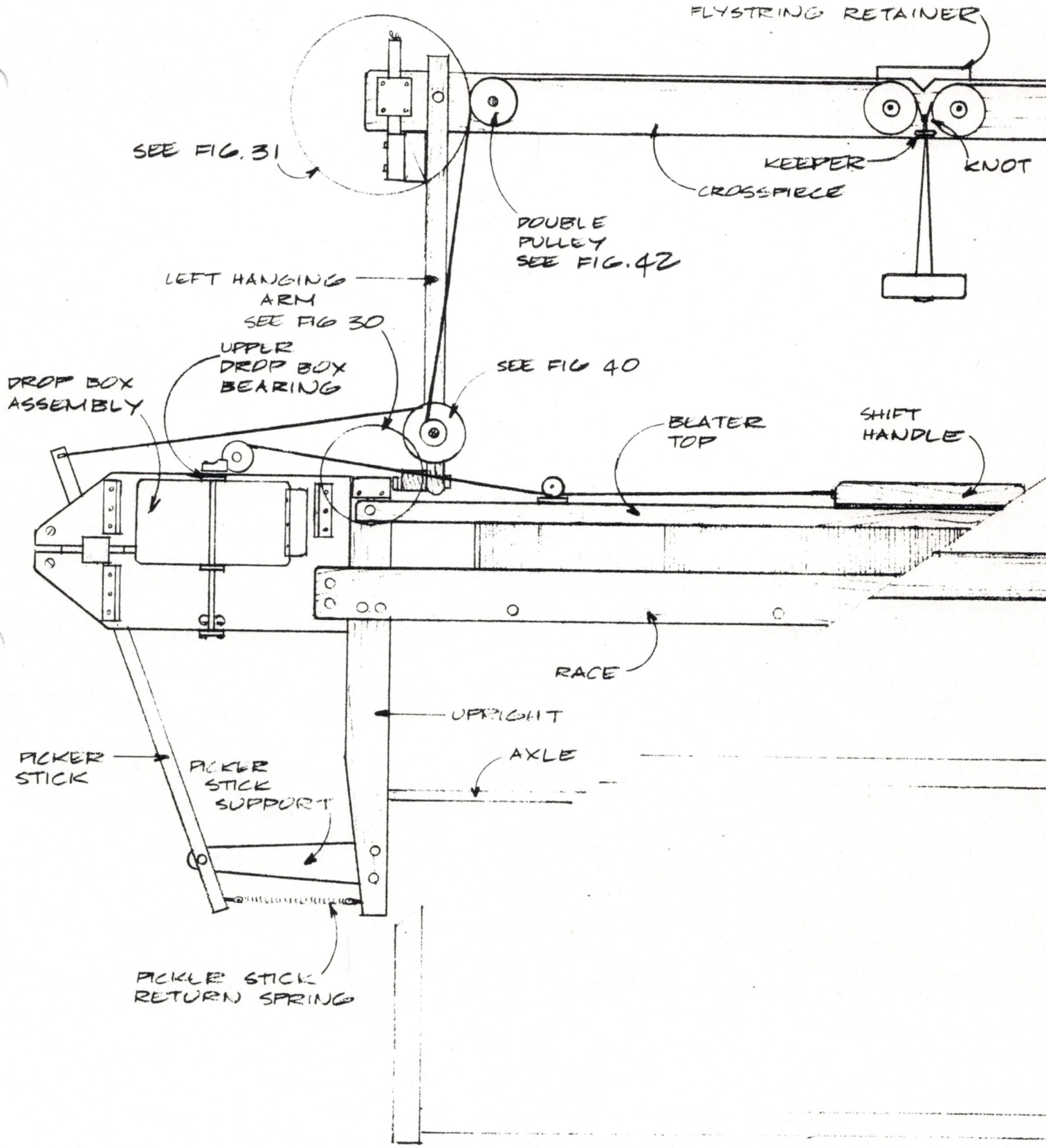
half-way into the box that is now aligned with the Shuttlerace. This will hold the box in the upper position and both of your hands will be free to fiddle with the cable.

X. Once both cables are attached you will need to adjust the cable lengths. Notice that the cable has a threaded rod crimped onto it at the end that attaches to the Shift Handle (see figure 47).

Notice that there is a lock nut there as well. Loosen the lock nut and you can shorten or lengthen the cable by screwing this crimped end into or out of the plate at the end of the Shift Handle. When you slide the Shift Handle back and forth notice that there are four detents, or places where the Shift Handle can be stopped. Each of these four detents corresponds to the four shuttle boxes. The best way to adjust these cables is to slide the shift handle to either the far left or far right detent position. This will put one Drop Box in the upper position and the other one in the lower position. Now all you have to do is adjust the cable as mentioned above so that the Drop Box Shelf is at the same height as the top of the Shuttlerace. It may help you to lay a straight edge across the Shuttlerace and Drop Box when doing this to assist you in getting the two perfectly aligned. When you have it properly adjusted, secure the locknuts on the threaded studs. Once you have adjusted both cables it's a good idea to put the Shift Handle in each detent position and check the boxes on each side for alignment. It is possible that there will be some slight variation in the spacing of the Drop Box shelves so you may not get absolutely perfect alignment. If this is the case for you, go for an average adjustment.

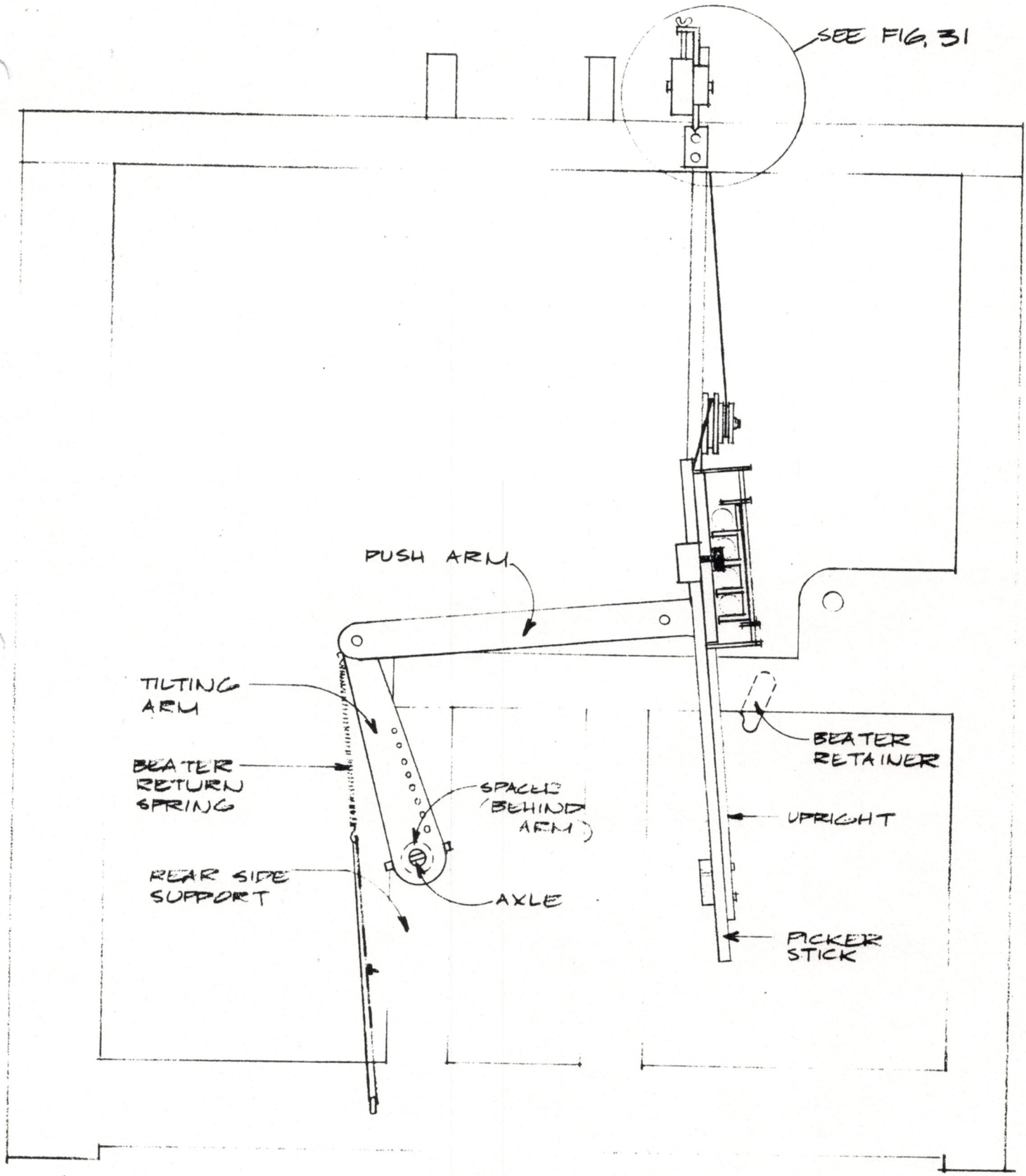
That completes the assembly of your four box flyshuttle beater.

Check your assembly with figure 43 to be certain you've gotten everything correct.



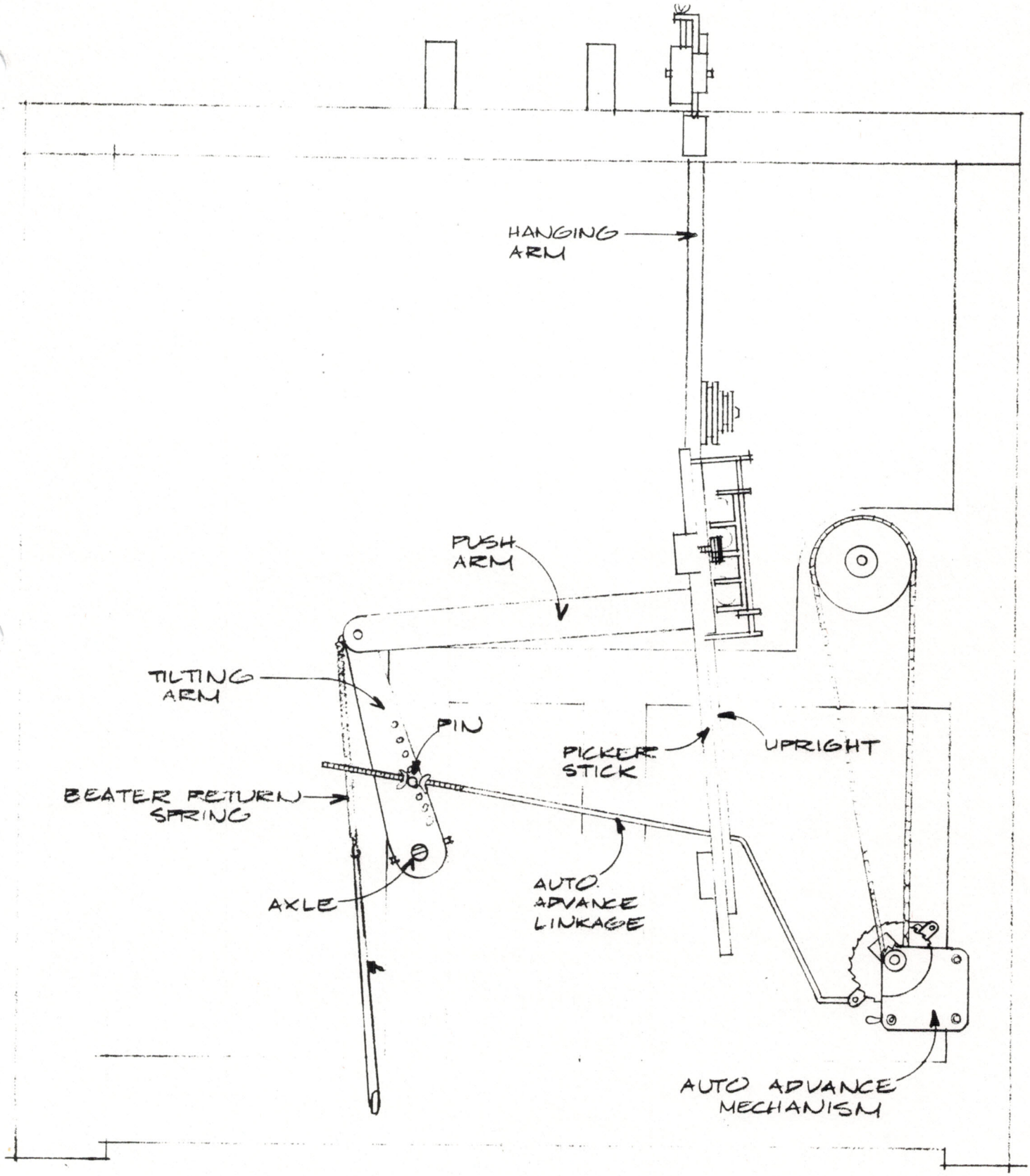
OVERHEAD FOUR BOX FLYSHUTTLE BEATER
SHOWN FROM FRONT

FIG. 43



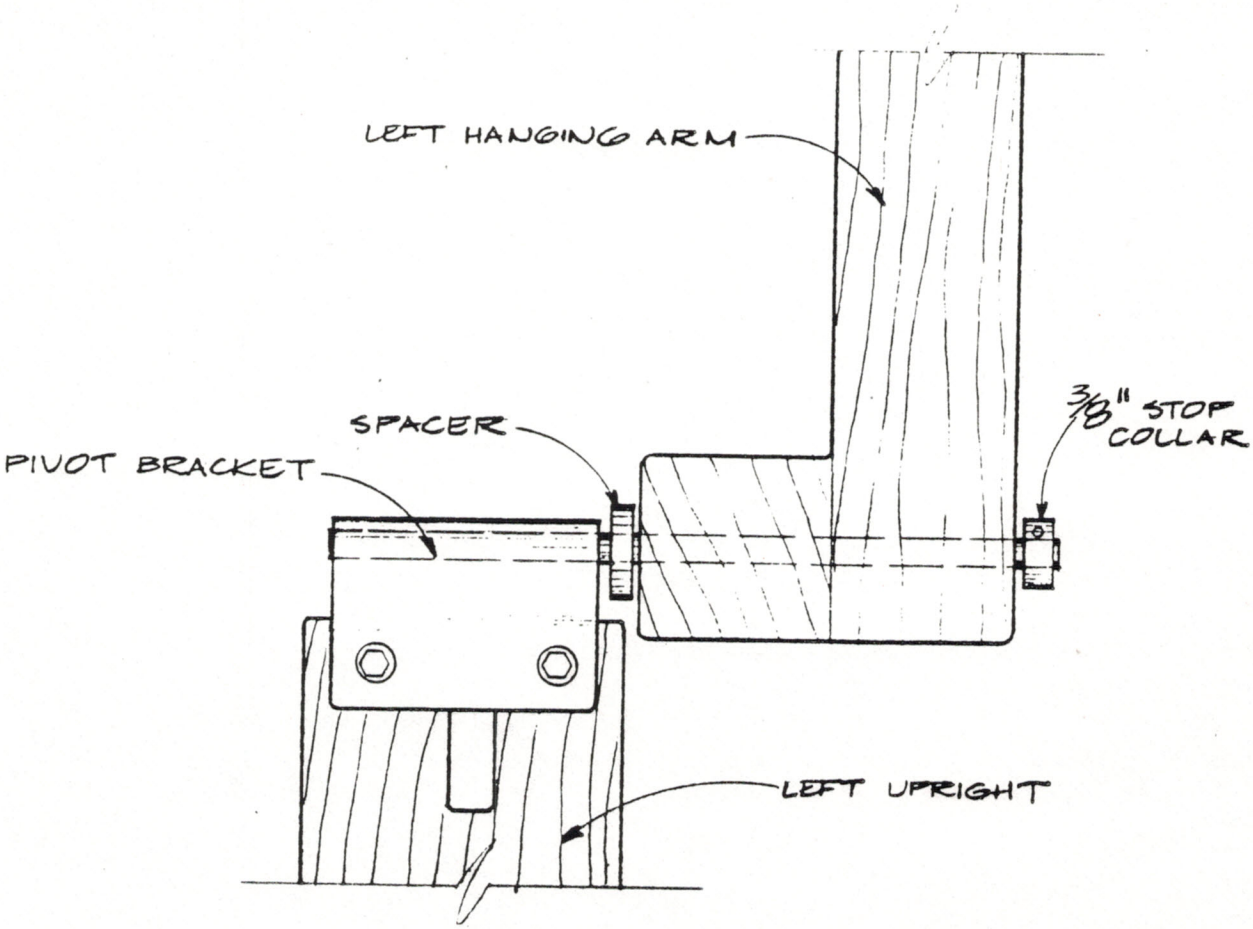
OVERHEAD FOUR BOX FLYSHUTTLE BEATER SHOWN FROM LEFT SIDE

FIG. 44



OVERHEAD BEATER WITH AUTO ADVANCE MECHANISM
SHOWN FROM LEFT SIDE

FIG. 45

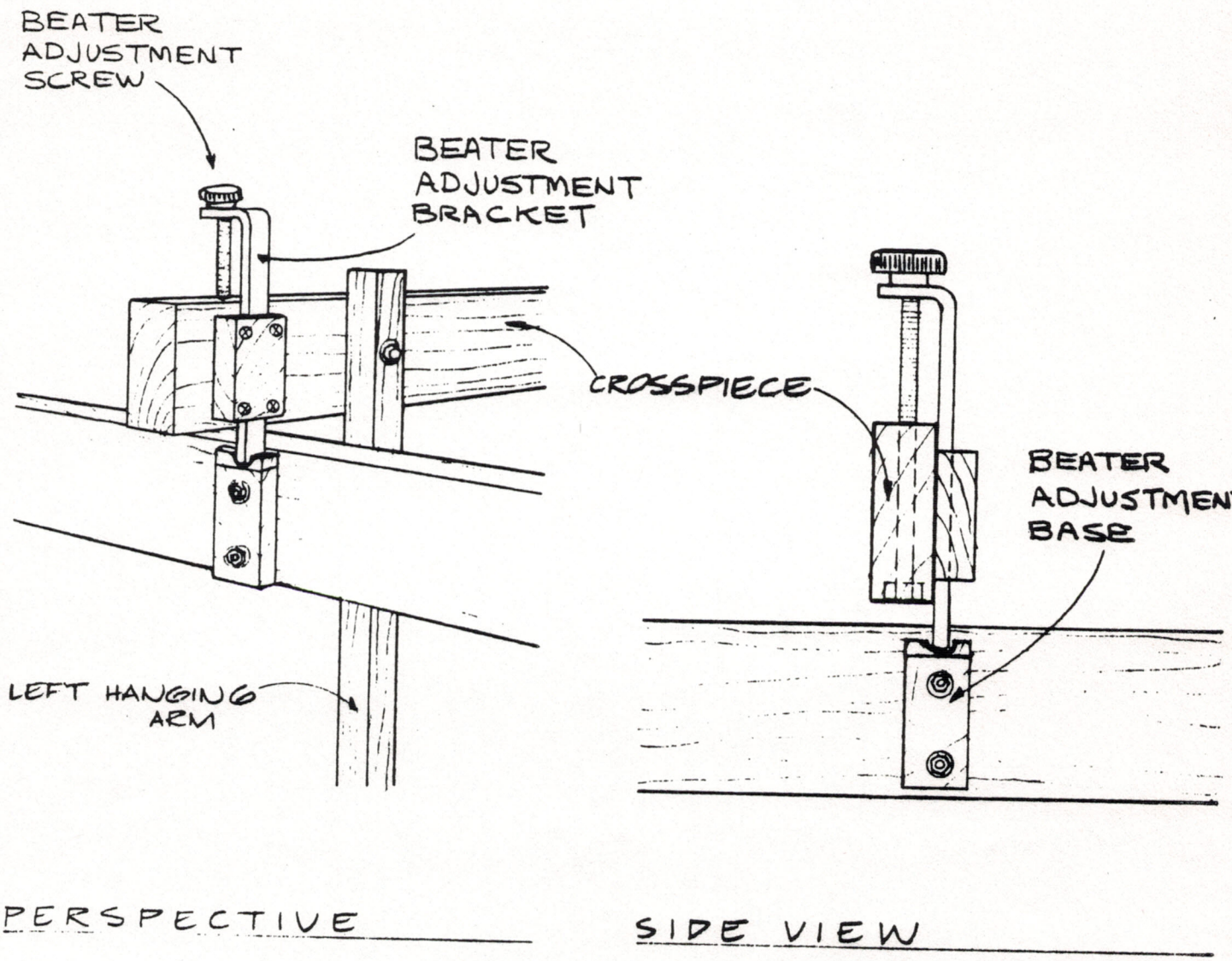


OVERHEAD BEATER

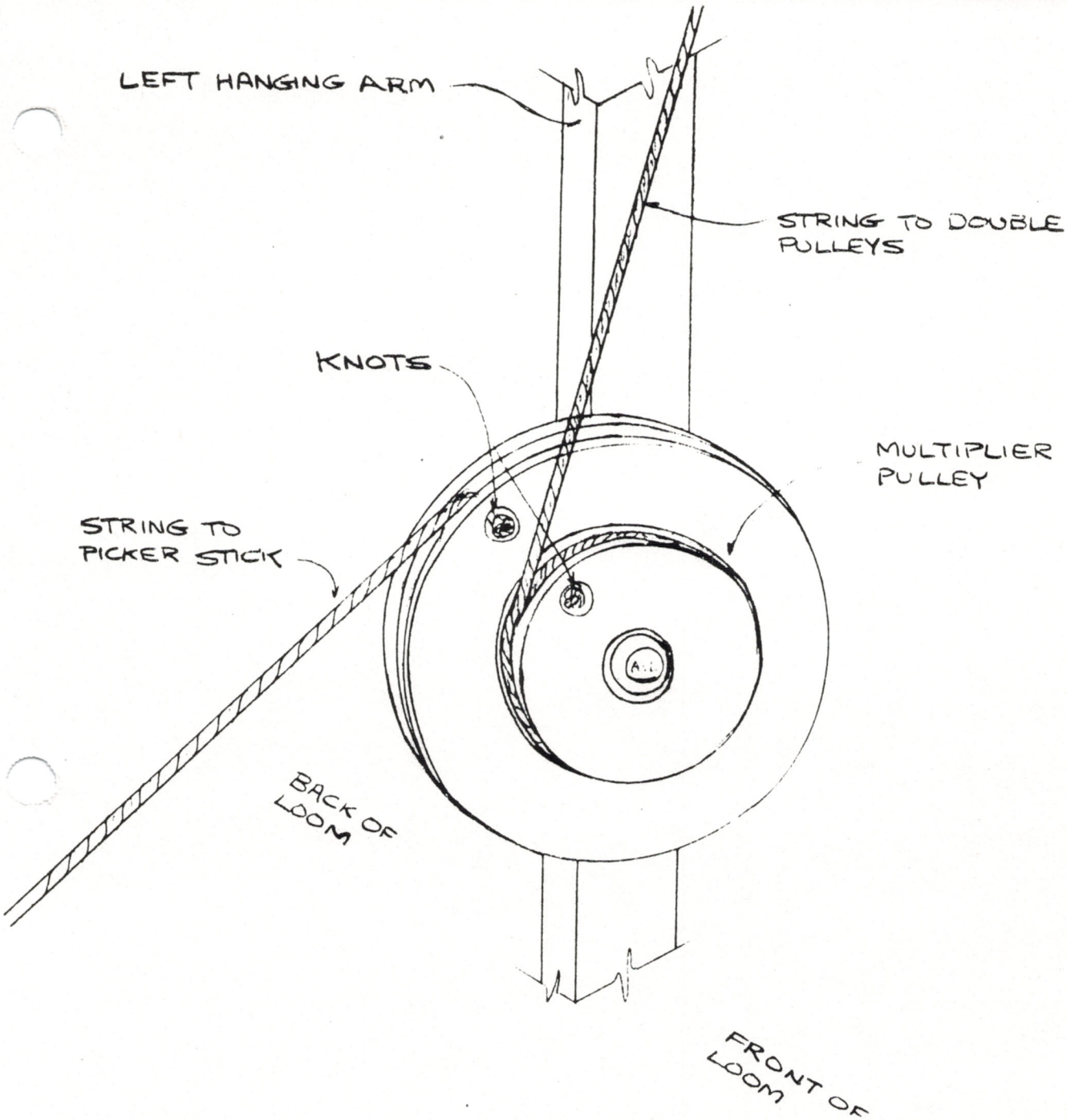
PIVOT BRACKET

SHOWN FROM FRONT

FIG. 30

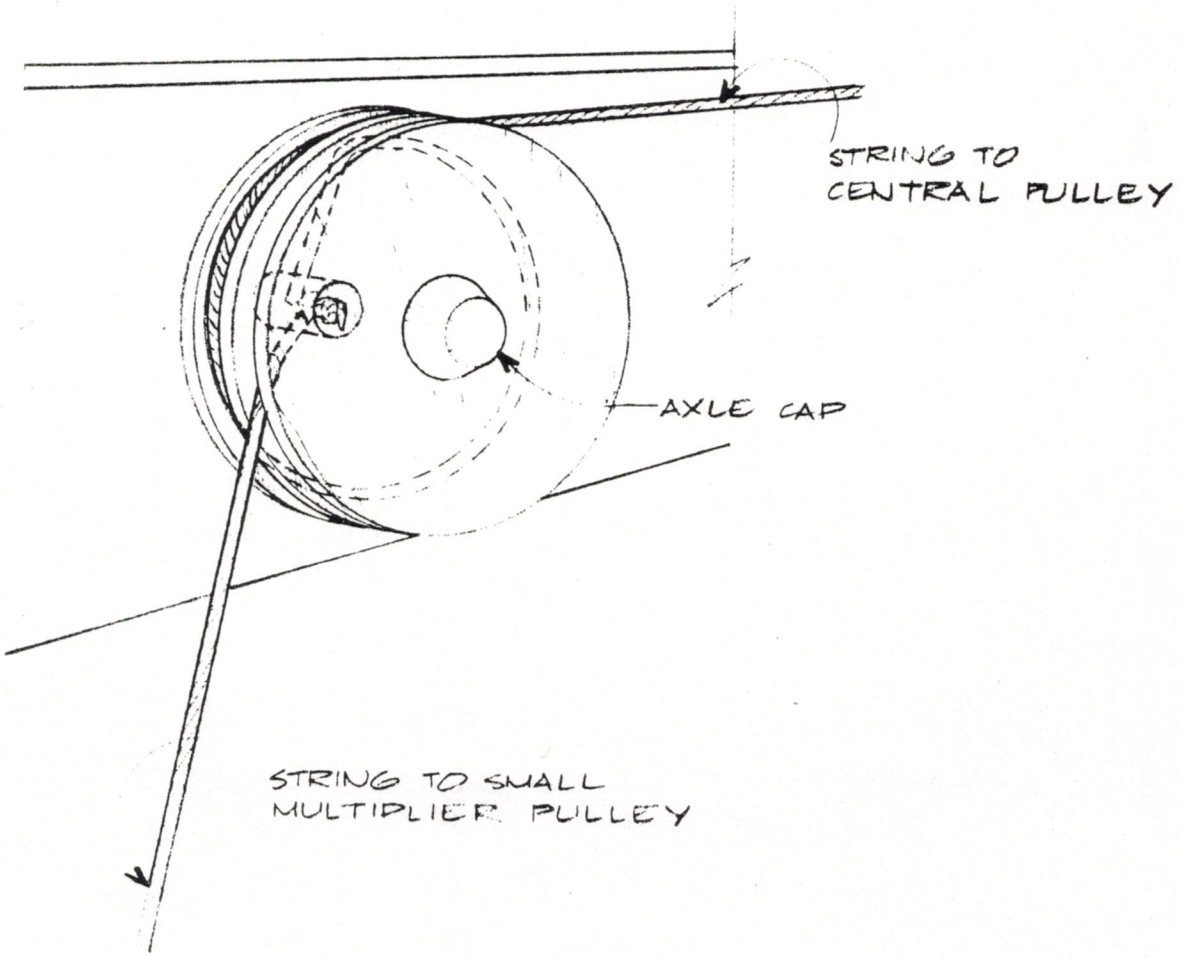


OVERHEAD BEATER
ADJUSTMENT BRACKET FIG. 31



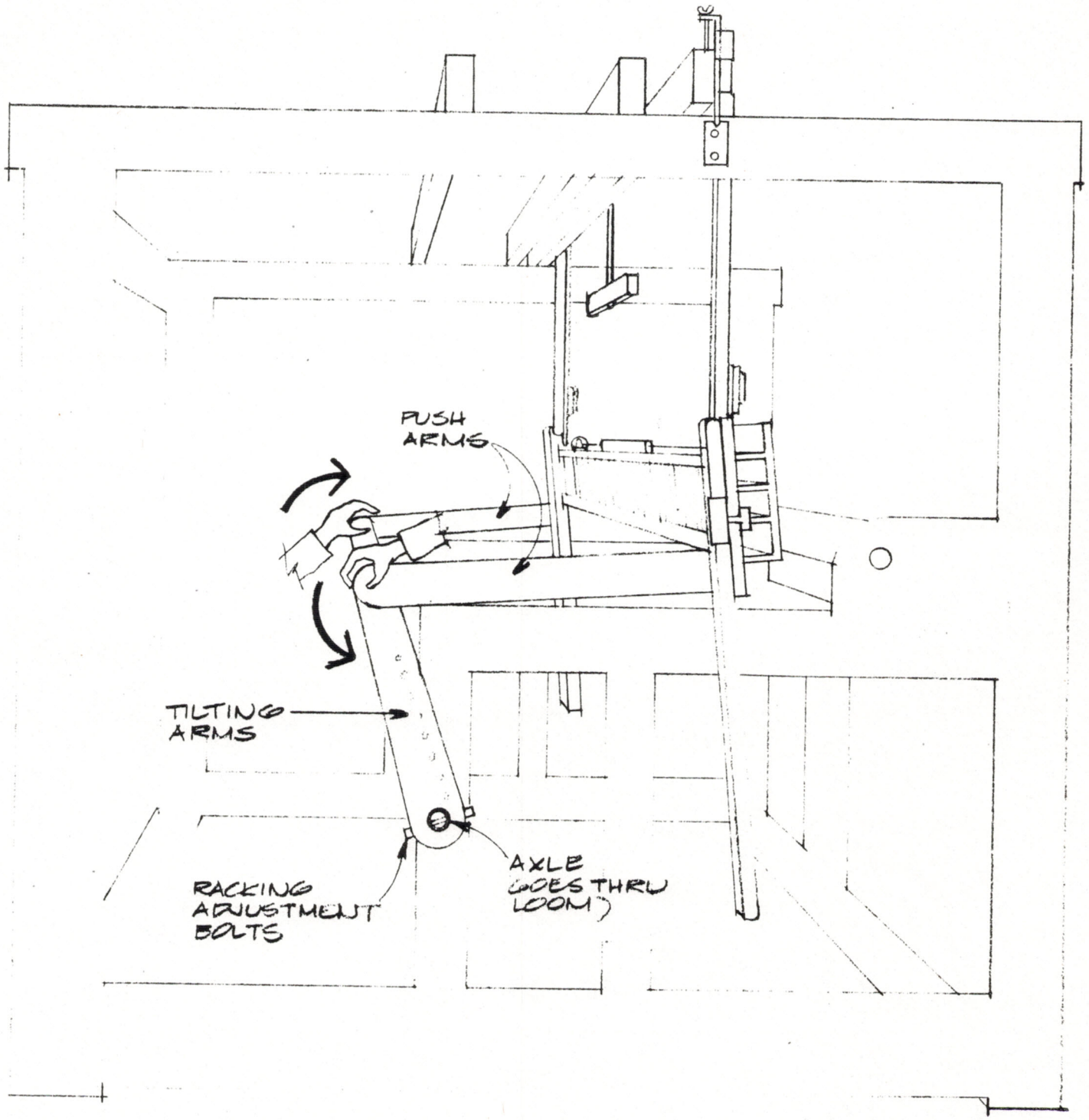
MULTIPLIER PULLEY

FIG. 40



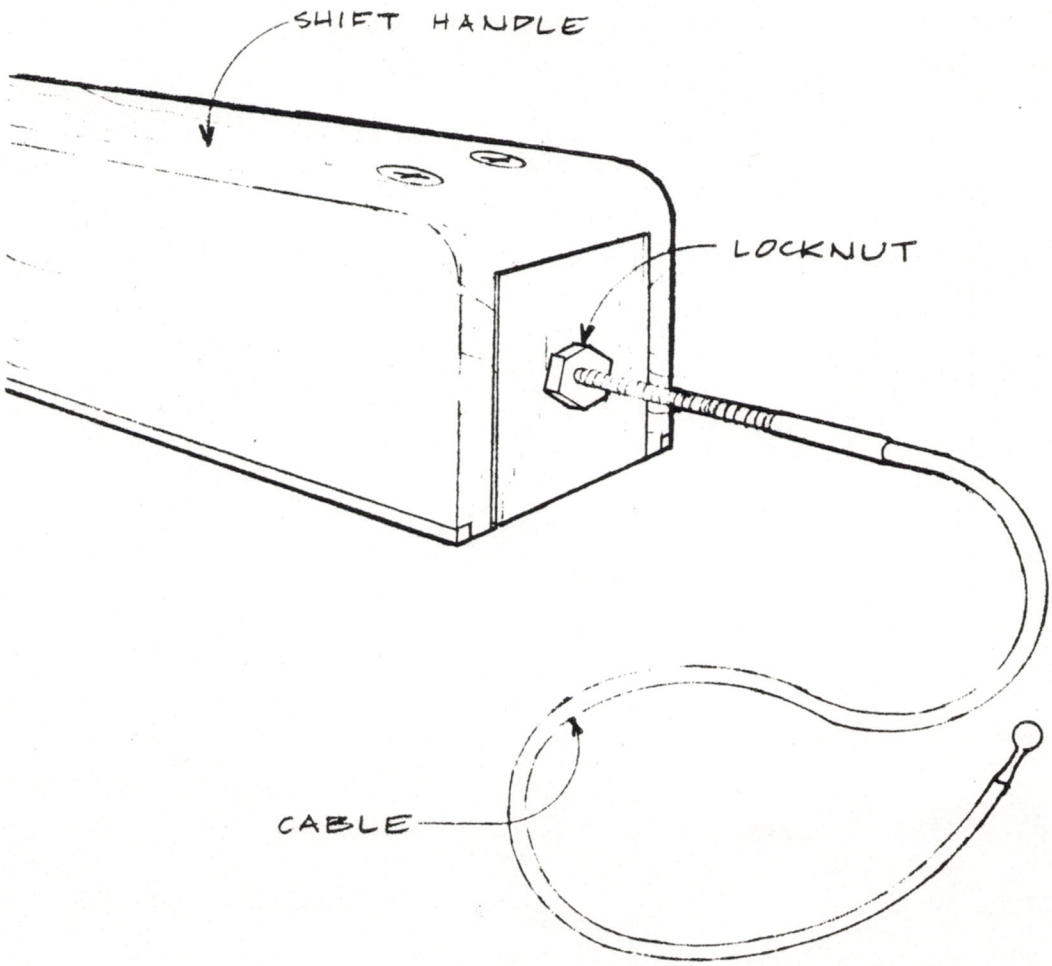
DOUBLE PULLEY

FIG 41



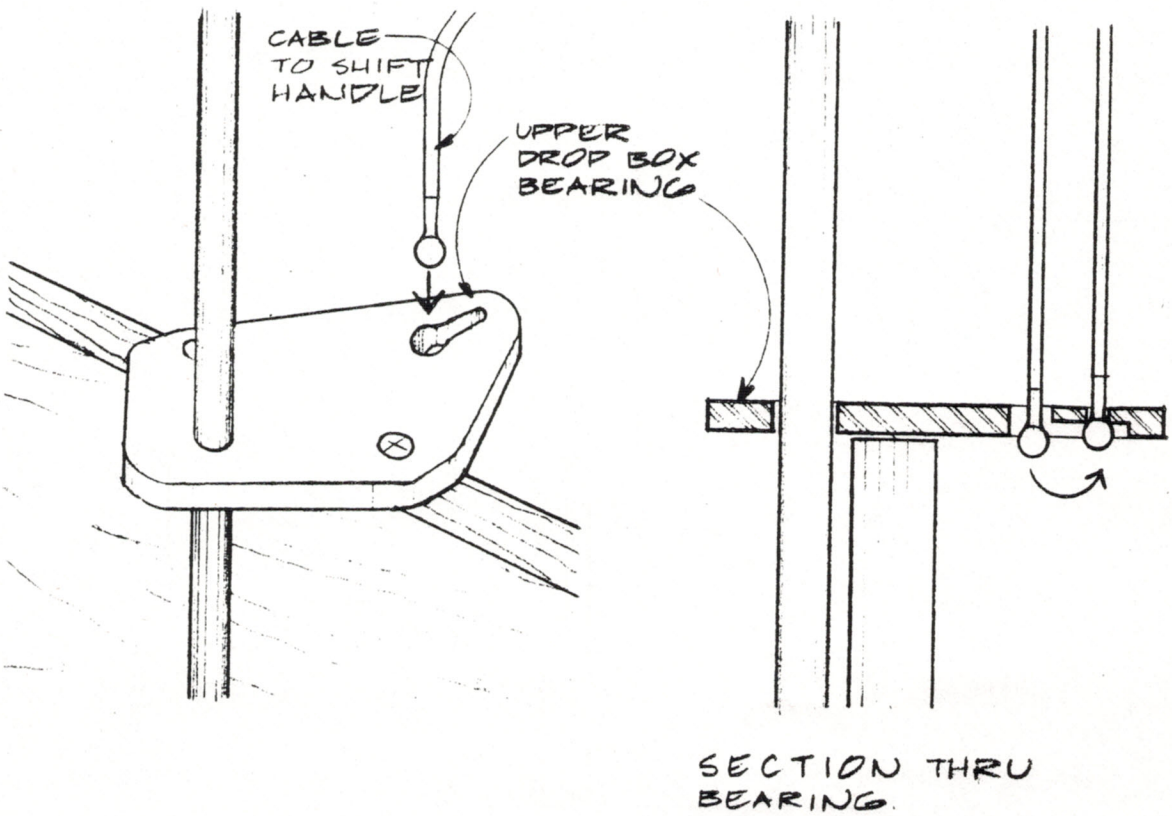
RACKING POSITION
OVERHEAD BEATER

FIG. 46



FOUR BOX FLYSHUTTLE
BEATER SHIFT HANDLE

FIG. 47



FOUR BOX SHIFT HANDLE
CABLE TO DROP BOX

FIG. 48

CLOTH STORAGE ASSEMBLY AND TIE-UP (Optional Equipment)

1. Cloth Take-Up Handle Assembly

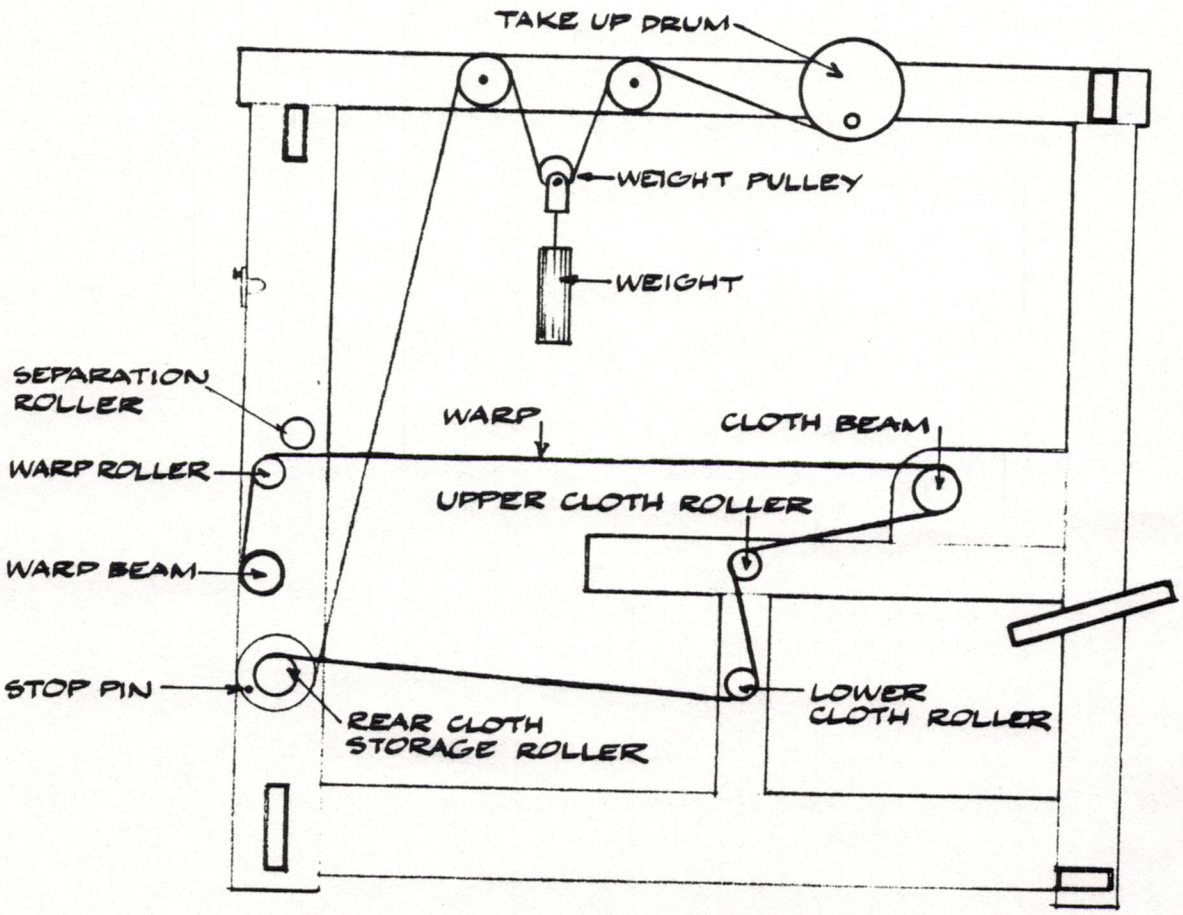
Locate the Cloth Take-Up Handle Assembly #30. There is a metal ratchet and shaft attached to it. Using your allen wrench, loosen the set screw inside the ratchet and remove the ratchet and one washer. From the inside of the loom, insert the shaft that's coming out from the center of the handle, into the front most hole in the right upper horizontal side frame member. (See figure 1 for relative position.) Slide the washer, then the ratchet, back onto the shaft. The ratchet should be facing so that the large flat face is toward the loom. Now tighten the set screw and flip the wooden ratchet dog (that's already mounted on the loom for you) around to intersect with the ratchet teeth.

2. Routing the Cloth Storage Cord

Walk back to the Cloth Storage Drum (that's the drum with the white cord wrapped around it). Remove the shipping safety tape and unwind about five yards of cord. Now take the stop pin that's anchored to the rear edge of the right rear vertical and insert it into the hole that goes through the cloth storage drum.

Route the cord over the top of the rear most pulley mounted to the inside of the right upper horizontal side frame member. (See figure 49) Now locate the counter weight and counter weight pulley/hanger assembly. The counter weight is a black cylindrical weight with an open screw eye mounted on top. The counter weight hanger/pulley assembly is shipped in its own bag and has a closed screw eye mounted to the bottom of it. The cord should now be threaded between the counter

weight pulley and its wooden hanger. Continue routing the cord by running it over the second pulley located on the right upper horizontal side frame member. (The counter weight pulley/hanger assembly should be riding on the cord between the two side frame mounted pulleys.) For looms with overhead beaters you should now route the cord through the hole that has been provided in the right Hanging Arm. Now bring the leading end of the cord to the Cloth Take-Up Handle and lay it on the concave surface. Locate the hole that goes from the base of the concave surface through the side and out toward the inside of the loom. Thread the end of the cord through this hole and secure it with a double knot. Check your routing with that of figure 49 to be certain you've gotten it right. Now attach the open screw eye of the counter weight to the closed screw eye of the counter weight pulley/hanger assembly. Take up the slack of the cord by turning the Cloth Take-Up Handle counter-clockwise until the weight is a few inches below the upper right horizontal side frame member.



SECTION THRU LOOM SHOWING ROUTING TO REAR ROLLER

FIG. 49

RADDLE (Optional Equipment)

The Raddle #41 is inserted into the holes in the back edge of the rear vertical side frame members. See figure 1 for relative position. These holes are used to mount the raddle for warping both the standard beam and the second beam. Be certain that the removable portion of the raddle is to the top. Once mounted into the holes, the raddle is not only held firmly in place but is also perfectly centered and can be left in place while weaving.

TENSION BOX (Optional Equipment)

Locate your tension box track, hardware and tension box. (See figure 20)

1. Mounting the Track Arms

   If you have ordered a sectional beam and have been following the directions, you'll have already mounted the Tension Box Track Arm mounting studs . If you ordered a Tension Box and no sectional beam, here's how to install the track arms.

   Locate the 3/8" x 2 3/4" carriage bolts, black discs and bushings, washers and hex nuts. Insert the bolt through the hole in the black disc so that the square part under the head of the bolt makes contact with the countersunk portion of the disc. Slide the black bushing onto the bolt. Now install this assembly, from the outside of the loom, through one of the two holes provided on either rear vertical, as shown in the drawing. Slip the washer and nut on the inside of the loom frame and tighten with a 9/16" socket wrench. Repeat this process with the three remaining bolts.

2. Mounting the Track

Now mount the track to the brackets on the track arms using the four 5/16" x 2 1/2" hex bolts, washers and square nuts. Orient the track so that the lengthwise groove is on top. You may wish to refer to Figure 20 to clarify this procedure.

3. Mounting the Tension Box

The AVL tension box track mounting system now employs a quick release advantage. To install the track/arm assembly you simply place the track arms between the two externally mounted studs that you attached to each rear vertical of the loom earlier. The track arms should initially go in at an angle with the front stud fit into the notch on the upper edge of the track arm. Then lower the track/arm assembly to a horizontal position, at which point the lower notch on the track arm should align with the rear stud. This will hold your tension box in place while warping your loom. When you are finished with the tension box, the track can be removed easily if it is in the way while you are weaving.