

# Micro Compound Lever Briquette Press

## Parts List, Notes, Drawings & Assembly

For lumber size 40 mm x 100 mm

This small press is suggested for single-family use, classroom demonstrations, or a small village operation where a small footprint, low cost, and easy to build press using hand tools are required.

The press has a low build cost (about \$18.00 U.S. dollars), is easy to build using hand tools, is light weight at 26 pounds (12 kg) and can create a force far in excess of that required to make a high quality briquette (typically in excess of 4,000 pounds, 1,800 kg). Briquettes can be produced at a rate of about twelve in ten minutes depending of type of mold used.



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## INTRODUCTION

### The Design:

The Micro Compound Lever Press has been designed and improved for use in developing countries where it is important to consider the ease of construction from a low-cost local building material. Wood easily satisfies both requirements whereas metal may require a higher skill level, be in limited supply, or be cost prohibitive by comparison. The press can be constructed with a minimal skill level using power tools or hand tools.

**The press is capable** of creating a force far in excess of that required to make a high quality biomass briquette. For example, with 70 pounds (32kg) of force on the handle, the force on the briquette located 4 inches (100 mm) from the end pivot point, will be 4,000 lb (1,800 kg). Based on a typical biomass pressing requirement of 145 lb/in<sup>2</sup> (65 kg/in<sup>2</sup>) of force, the required pressure on a 3 inch (75 mm) briquette with a 1 inch (25 mm) hole would be 900 lb (400kg). A 4 inch (100 mm) square briquette with no hole requires about 2,300 lb (1,040kg). A 6 inch (150 mm) diameter briquette with no hole requires about 4,000 lb (1,800kg) of force. The press can easily exceed these force requirements.

**Characteristics:** the press is based on a 40 mm x 100 mm dimensioned lumber standard and requires about 7½ meters of lumber. The footprint is 760 mm wide, 360 mm front to back and 725 mm high. The weight is about 12kg and the material cost is about \$18.00 U.S. dollars. The compression range is from 320 mm to 165 mm.

**Type of Wood:** Soft wood can be used, however, and if available, we recommend hardwood for the high-pressure lever arm (Part C) to increase durability. Select wood with straight grain and no knots for parts C, E, G & Part H.

**Water resistant coating,** if available, apply polyurethane, paint, thinned motor oil, or whatever the local area can provide. Store in a dry and sun free location during periods of nonuse.

**Modifications:** preserving and recycling the water used for the biomass mixture can be accomplished a number of ways. If the clearance below the press is inadequate for your container, adjust the length of the legs, A & B below the base D to accommodate. You may wish to tilt the press forward allowing water to drain to the end and into a tray. Grooves in the base can assist that drainage. See step 15 for a suggested reduction in weight and wood usage.

**Bolts & Nuts:** Not all locations of the world have a ready supply of bolts & nuts. Previous builders have had good success using metal pipe or metal rods pinned with roll-pins or even nails.

**Briquette Molds:** The press has a compression range from 12½" (300 mm) to 7½" (190 mm) and can be used for briquettes made from Biomass, BioChar or Charcoal Fines. See the document "[How to Make Biomass Briquette Molds](#)" for a wide variety of mold designs suitable for this press.

**Note:** Nominal dimensions are 40 mm x 100 mm and the performance characteristics are based on these standard dimensions. The builder may need to adjust the plan dimensions accordingly to compensate for the lumber found in the country where the press is being built. Attempt to maintain the accurate hole spacing for parts E, C & G if adjusting the plan dimensions. Cost is based on material purchased from Home Depot, March, 2012, USA. If you have questions regarding the construction of this press please contact us through the web site below.

## Labeled Parts

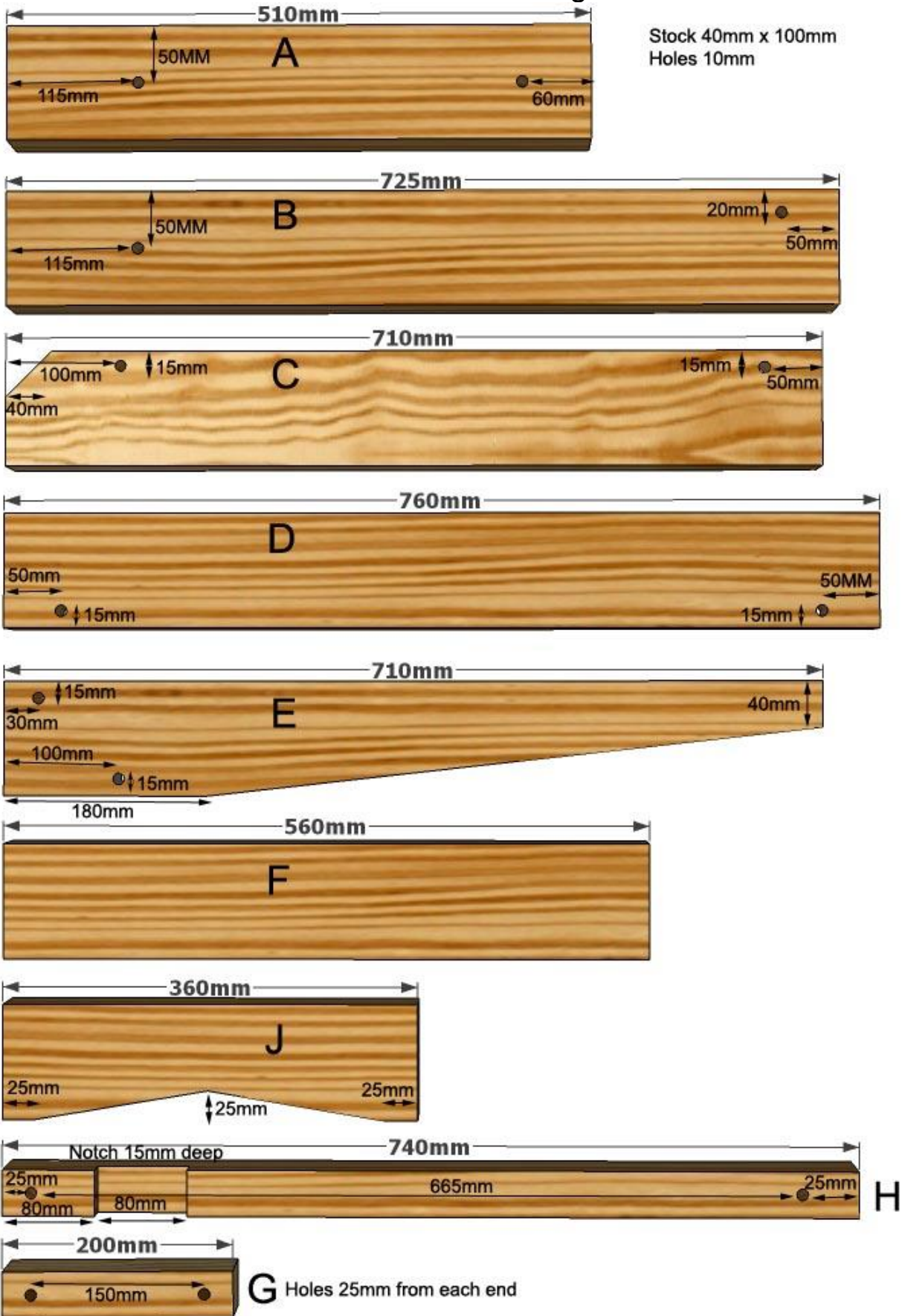


## End Views

## Parts List

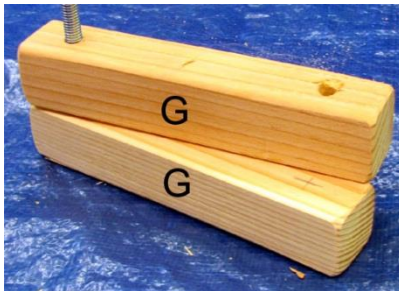
PART	PCS	Length	Stock Size	Description	See drawing for details and for hole locations
A	2	510 mm	40 mm x 100 mm	Front Legs	10 mm holes, 60 mm from top and 115 mm from bottom, centered on stock
B	2	725 mm	40 mm x 100 mm	Rear Legs	10 mm holes, 115 mm from bottom, centered on stock and 50 mm from top, 20 mm from front face.
C	1	710 mm	40 mm x 100 mm	Lever Arm	10 mm holes, 100 mm from left side and 50 mm from right side, 15 mm from top. 45° cut, left top, 40 mm
D	1	760 mm	40 mm x 100 mm	Base Beam	10 mm holes, 50 mm from each, 15 mm from bottom.
E	1	710 mm	40 mm x 100 mm	Handle	Two 10 mm holes, 30 mm from left, 15 mm from top and 100 mm from left, 15 mm from bottom. Tapper to 40 mm beginning at 180 mm from left
F	2	560 mm	40 mm x 100 mm	Beam Sides	Fasten with screws or nails.
G	2	200 mm	40 mm x 40 mm	Arms	10 mm holes, 25 mm from each end centered on stock.
H	1	760 mm	40 mm x 40 mm	Brace	Two 10 mm holes, 665 mm center to center, 25 mm from each end centered on stock. Notch 80 mm wide, 15 mm deep, begins 80 mm from left end. If carriage bolts are used the notch can be 6 mm deep.
J	1	360 mm	40 mm x 100 mm	Foot	Notch begins 25 mm from each end, 25 mm deep
K	1	260 mm	40 mm x 100 mm	Foot	Stabilization Foot (Optional)
	4	140 mm	10 mm	Hex Bolt	10 mm x 140 mm Hex or Carriage Bolt/Nut (builders choice)
	2	180 mm	10 mm	Hex Bolt	10 mm x 180 mm Hex or Carriage Bolt/Nut (builders choice)
	20		10 mm	Washer	Use four washers for each movable joint (inside and outside)
	12	65 mm	#10	Fasteners	Wood Screws to fasten beam sides, 65 mm

# Dimensioned Parts Diagram

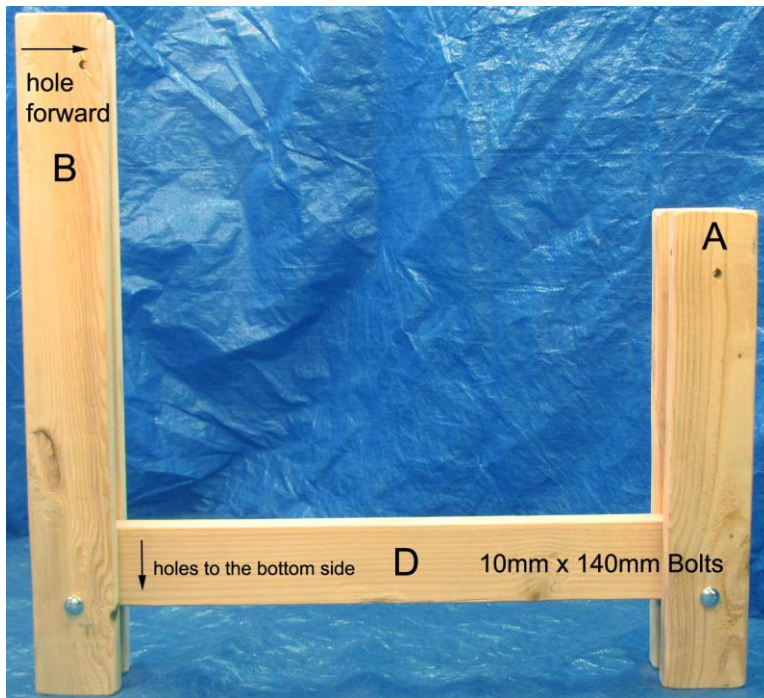


## Construction & Assembly

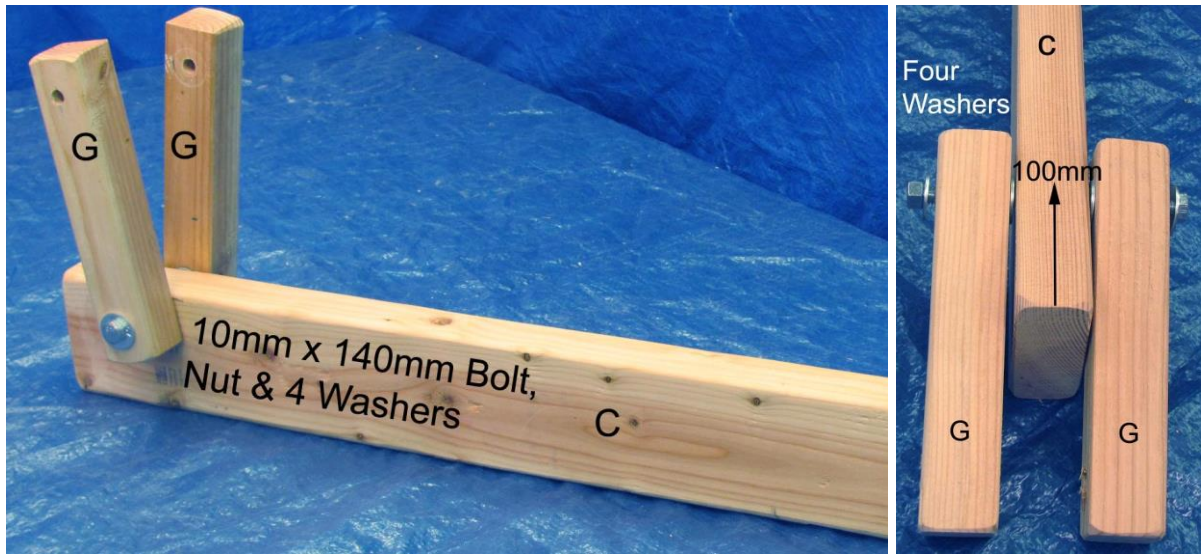
1. Select wood with straight grain and few knots if possible. If hardwood is plentiful and inexpensive, use hardwood for part C, otherwise, softwood will be okay
2. Cut material per the parts list using the cutout diagram as a guide for efficient use of lumber.
3. Cut a 45° notch on the top left corner of part C as shown in the parts diagram, 40 mm on each side.
4. Sand and smooth edges to remove splinters.
5. Drill 10 mm bolt holes per dimensioned parts diagram.
6. Holes in the lower section of parts A & B are 115 mm from the bottom and centered on the stock. Drill one hole accurately in part A and use it as a guide to drill the other A and the two B's. Clamp as necessary.



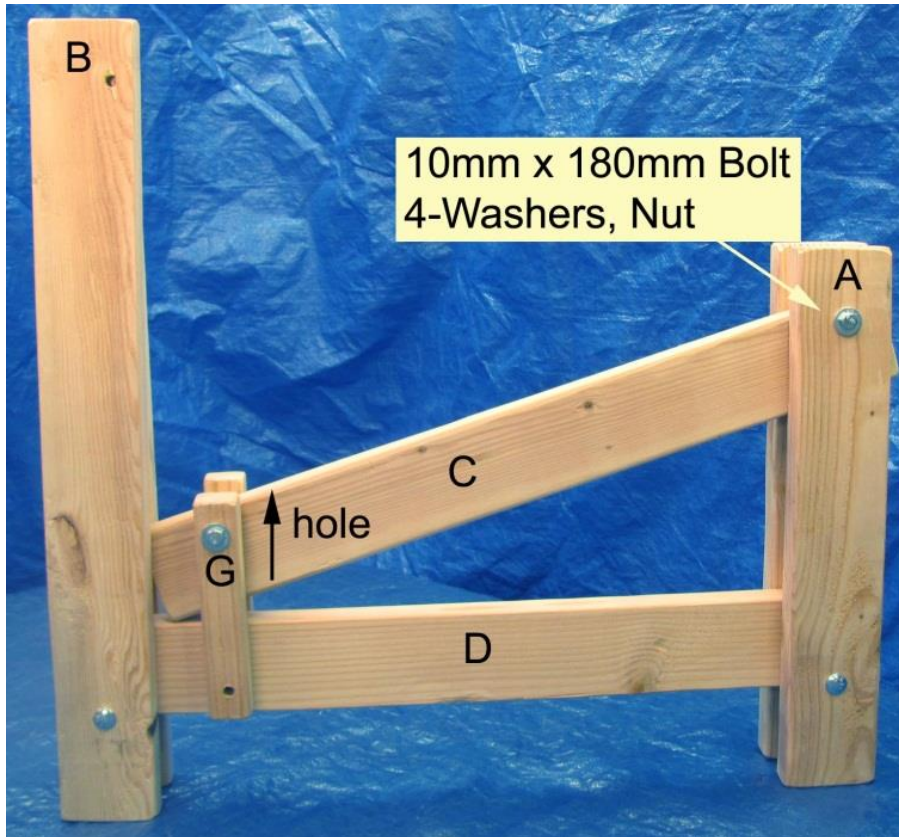
7. Part G should be drilled using one as a guide for the other. Drill the two holes in one piece of Part G and one hole in the second G. Using a 10 mm bolt to pin the two together as a guide to drill the second hole in the remaining G. Drill across the grain for maximum strength



8. Bolt legs A & B to part D using 10 mm x 140 mm bolts. Position part D to locate the holes to the bottom side as shown. Hand tighten all bolts until final assembly is complete.



9. Assemble arms G to C as shown using a 10 mm) x 140 mm bolt, 4-washers and a nut. The 45° notch at the end of part C is not shown in this picture.



10. Connect the C G assembly to part A using a 10 mm x 180 mm bolt, 4-washers and a nut. Position part C to locate the hole for part G to the top side as shown.

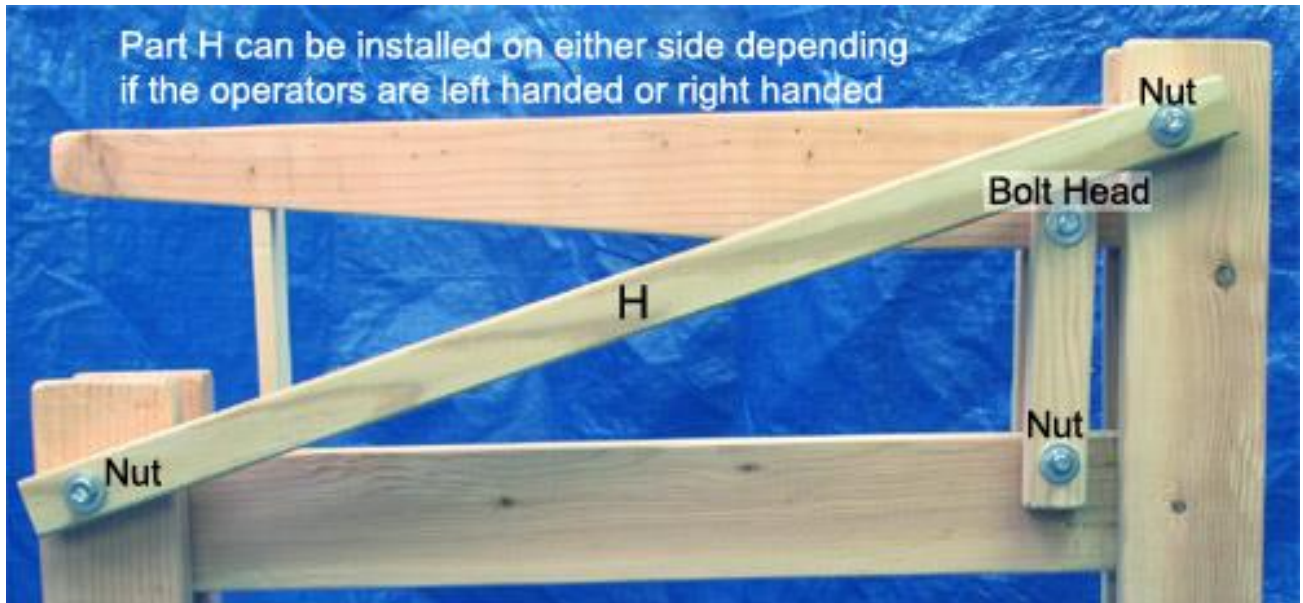
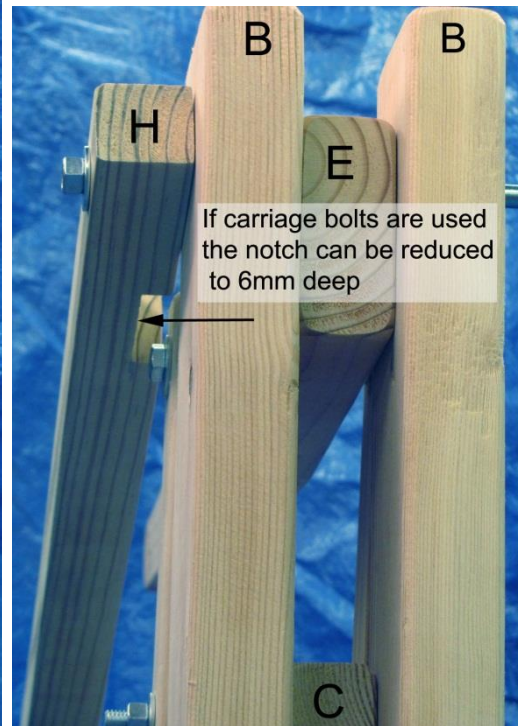
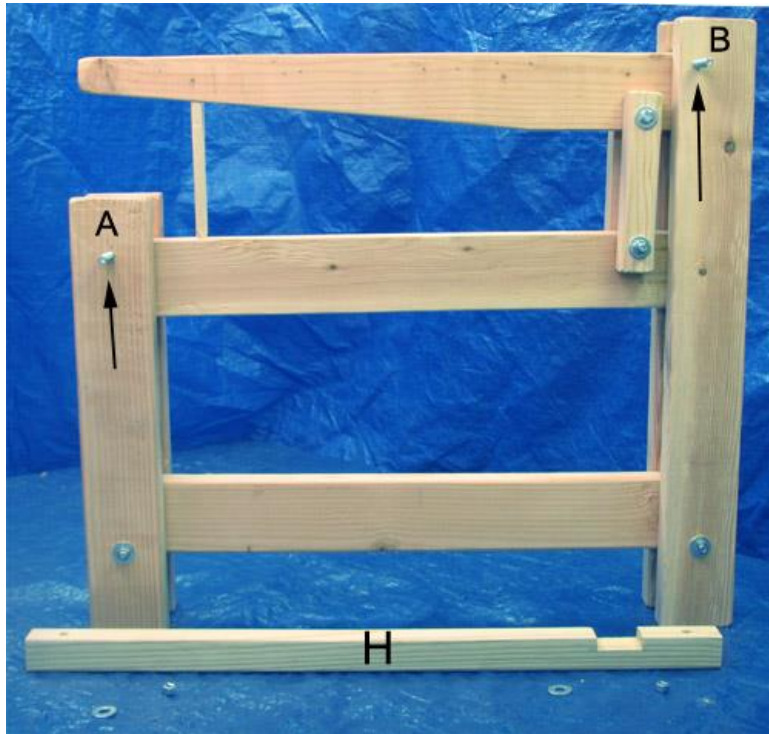


11. Connect part E to leg B using a 10 mm x 180 mm bolt, 4-washers and a nut.

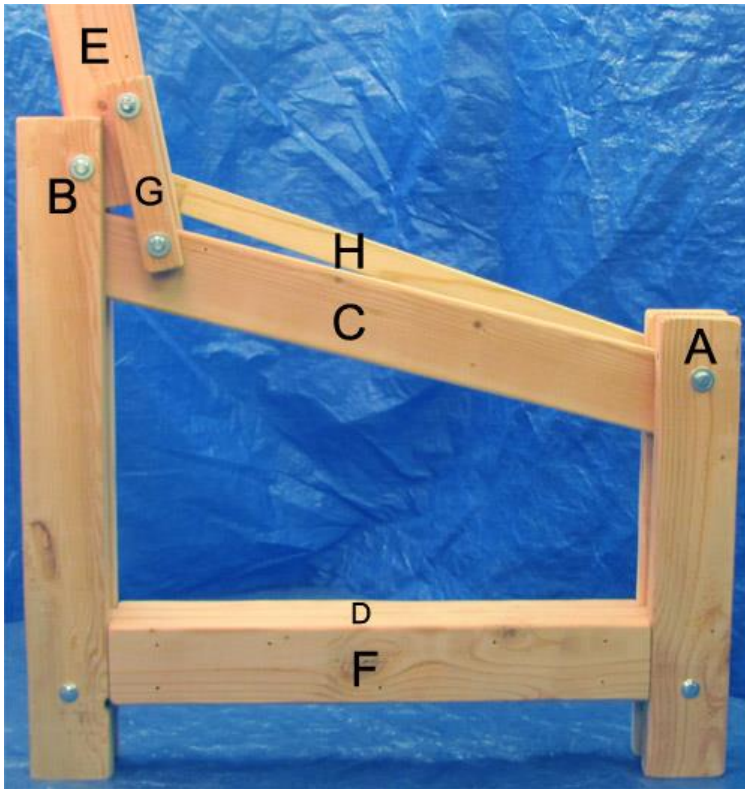


12. Raise part G and connect to handle E using a 10 mm x 140 mm bolt, 4-washers and a nut.





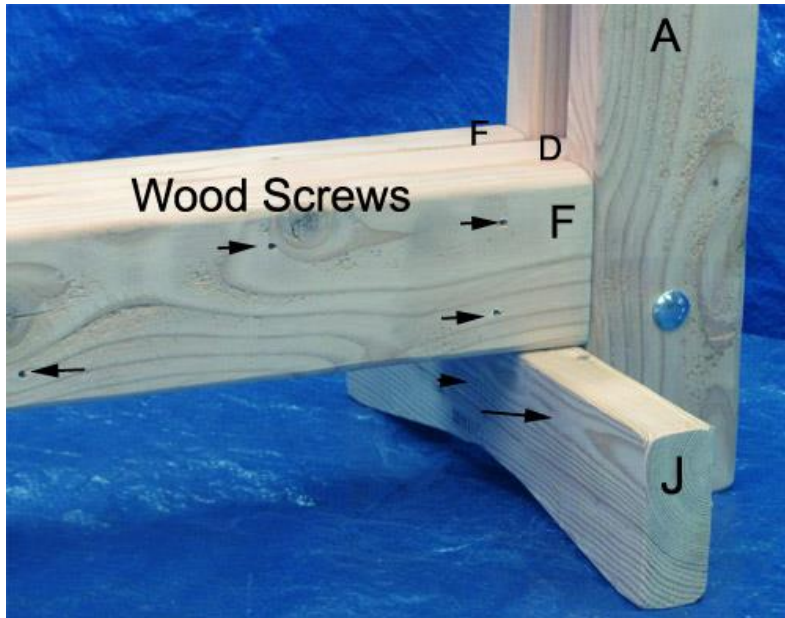
13. Connect part H to the existing bolts in legs A & B. Make certain the bolt for part G under the notch is installed with the head end showing and not the nut end. Part H can be installed on either side depending if the operators are right handed or left handed. (Right hand version shown)



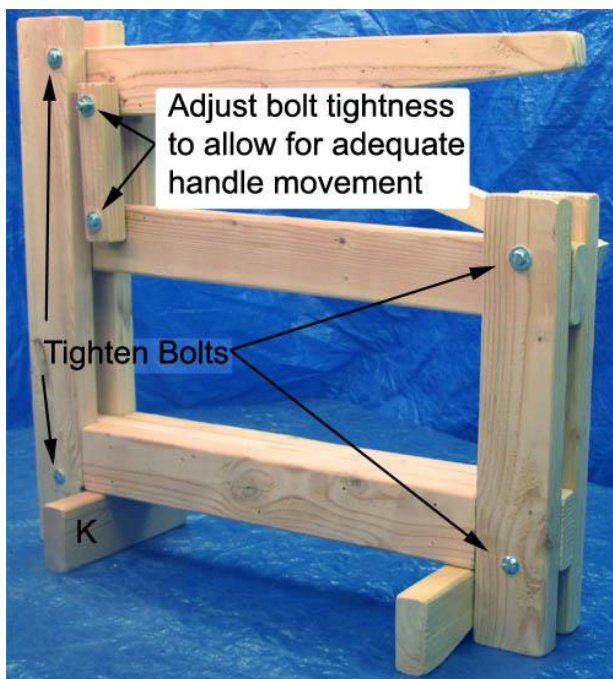
14. Handle E should open to this position.



15. If you want to minimize the weight and wood usage you can eliminate one of the two parts “F” and attach F to the top side of Part D as shown above. This will reduce the opening between F and C by 1 ½” 89 mm. If you need to maintain the 7 ½” opening between F and C, extend the length of legs A & B by 1 ½” 89 mm.



16. Attach part F, F & J using 65 mm wood screws or 75 mm nails



17. Adjust the bolt tightness for Part G to allow for adequate handle movement. Completely tighten the other four bolts. Part K can be used for extra stability if the press sets in soil or on a rocky surface.

18. If available, coat the press with a water resistant finish like paint, polyurethane, used motor oil, lard or grease. If the finish is in limited supply it is best to at least coat parts D, F, J and the lower part of legs A & B.

When motor oil is used it helps to thin the first coat. Allow time for the wood to absorb the oil then apply a second coat using regular strength oil.