Transportable Warré Hive Lift

General

This lift is designed for use with David Heaf's style of hive stand. It is easy to make and more convenient than a Gatineau lift to transport. It is held together only by bolts and screws and can be made for under £100.

Dimensions

The lift illustrated is sized to Warré boxes of wall thickness 30 mm. The overall width could be reduced by 10 mm for boxes made from wood of 25 mm thickness. The height of the upright sections should take into account the handle placement on the Warre boxes to be used. The lifting arms of this version lift up to 30 cm and will work with a various designs of box handles. In principle, shorter upright sections could be used with some handle designs.

Capacity

The shelving brackets used for the lifting arms are rated to 60 kg. The slight play in the runner mechanism at heavy loads can be compensated for by raising the ends of the lifting arms slightly (eg. by wrapping with tape). The drawer runners contain heavy duty parallel ball bearing races designed to support 40 kg for extension over their whole length. Only a part of this extension is needed for the lift. In practice they cope easily with weights up to about 55 kg (this is heavier than a standard stack of four Warré boxes at the point where they would need to be nadired). A version of this lift was tested to 85 kg without catastrophic failure, although slight distortion of the parallel races in the runner mechanism was noted after lifting this weight.

Components

All parts are readily available at DIY stores – a rough indication of price is given. Prices may be much cheaper on-line but beware of less robust and/or heavier versions of shelf brackets. On the other hand, cheaper and lighter winch would suffice. Serviceable drawer runners are often thrown out during kitchen refurbishments. Softwood off-cuts were used for the wooden parts. If seasoned hardwood is available it may be possible to dispense with the aluminium tubes used to reinforce the transverse sections. The hanging balance shown is recommended for accuracy and robustness.

Assembly

The only critical part is making sure the frame is perfectly square. The frame can be pre-assembled on a square template to help achieve this.

Refinements

A detachable shoulder strap might help with transport. A second parallel pair of single slot brackets mounted on the *inner frame* would allow boxes with a wider range of widths to be lifted.

Operation

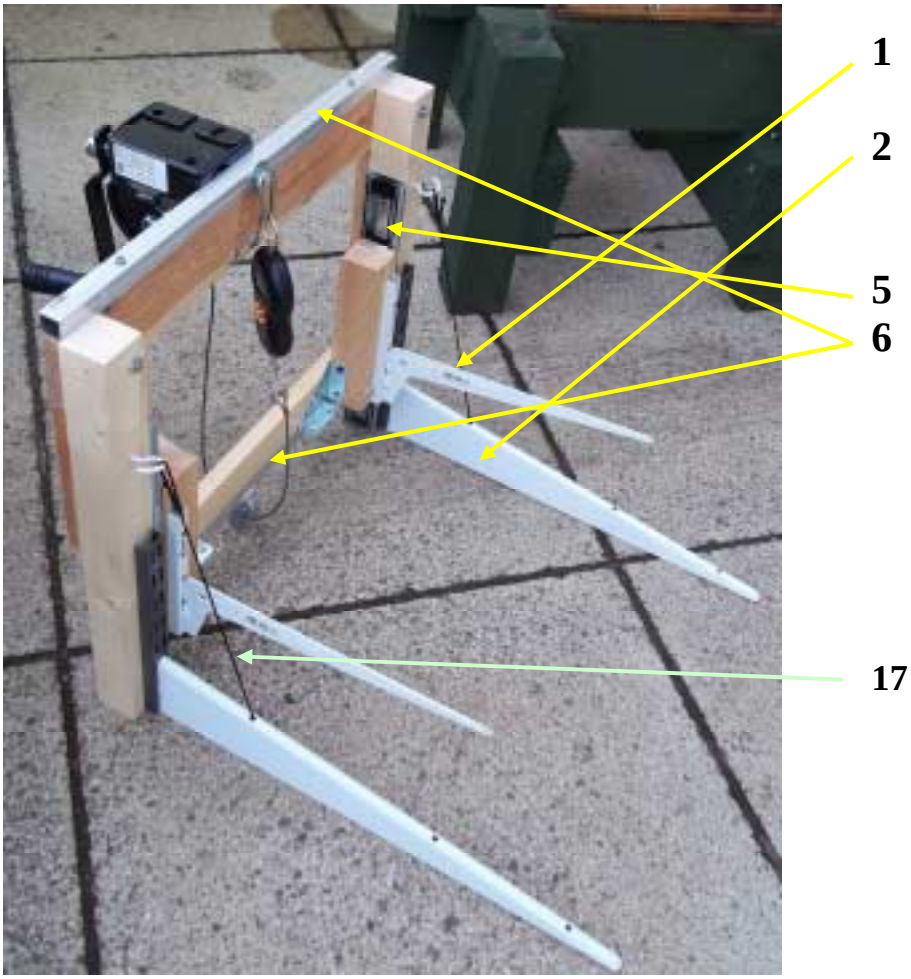
For lifting without the scales the looped end of the steel wire is hooked to the protruding bolt on the *upper transverse section*. To use the lift as a weigh scale, the balance is attached to the lift via the carbine hook so that it the scale hangs clear of the lift.

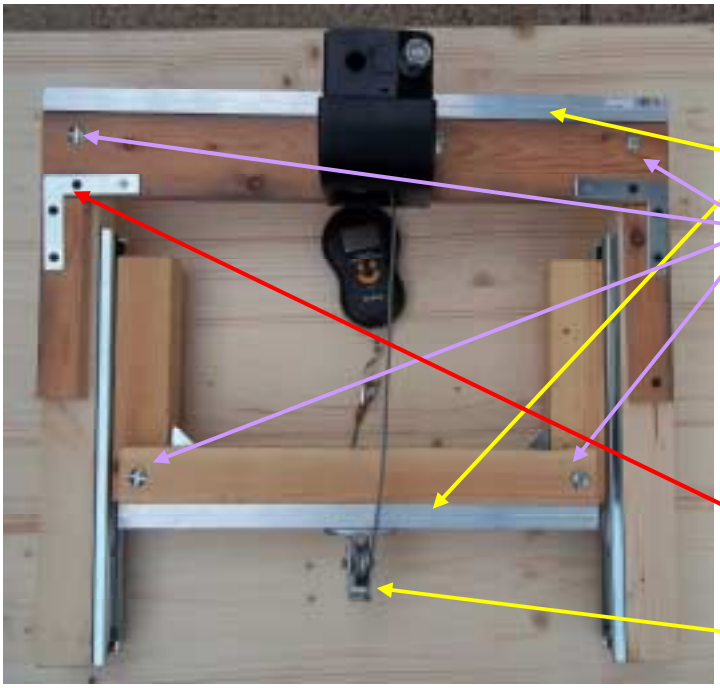
The scales can be tared by first lifting the assembled, un-laden lift (lifting arms attached) with a few turns of the winch. The balance is set to zero and the lift brought up against the back of the hive. The hive is lifted a centimeter or two, then lowered through a turn of the winch handle. The displayed weight is doubled to calculate the hive weight.

Parts List

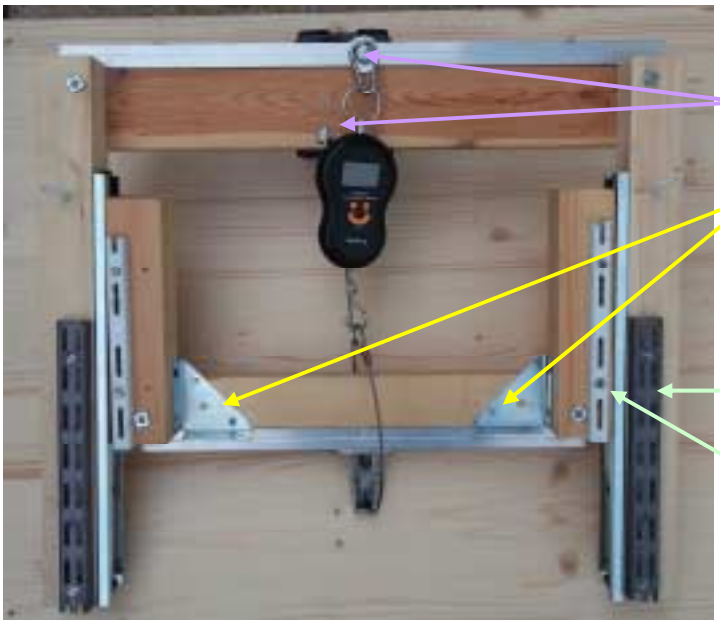
1. Two Single Slot Brackets White (300mm, rated to 60 kg) Model: Element-System (Wickes; £2.12 each)
2. Two Twin Slot Brackets (470mm) (Model: Element 32 - 89616 Rottenacker) (Wickes; £5.99 each)
3. Twin Slot Upright Bracket support (450mm) (Wickes; £4.99)
4. Single Slot Upright Bracket Support (500mm) (Wickes; £2.57)
5. Pair of Ball Bearing Full Extension Drawer Slides - Zinc Plated - 35cm (Homebase; £12.49 per pair)
6. Anodized Aluminium Square Tube (20 x 20mm x1m) (Wicks; £4.89)
7. Mushroom Head Roofing Bolts (7 x M6 x 50mm)
8. Screws: 60 mm, 38 mm and 10 mm. One washer (30 mm diameter)
9. Two Flange Brackets 63mm (Wickes £3.89 for 4)
10. Two Flat Corner Right Angle Bracket Repair Plates (Homebase)
11. Vertically mounted pulley with galvanised cast steel wheel across the mounting plate. (£2.75; Ebay)
12. 1.5 metres of 3 mm 7/19 316 Grade Stainless Wire Rope with one end looped and 5 mm carbine hook (made to order by UK Yacht Rigging & Supplies Ltd)
13. GO-CS 200 Hand Winch (£46.68; www.winchshop.co.uk)
14. Digital Weighing scales 40 kg (£3.99 Ebay)
15. Softwood pole (44 x 44 mm) approx. 1.5 metre
16. Softwood planks: (500 x 68 x 18 mm and 390 x 45 x 18 mm)
17. 3mm elastic shock cord (Ebay)
18. Two cup hooks.

Overview

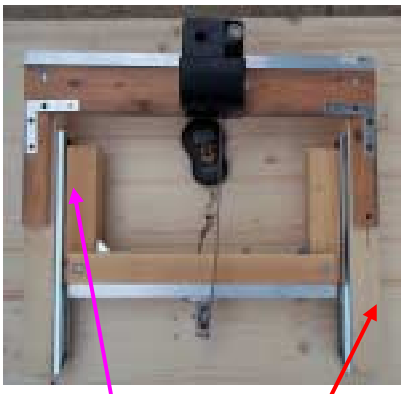




Frame (back)



Frame (front)



inner upright **outer upright**

upper transverse section

lower transverse section

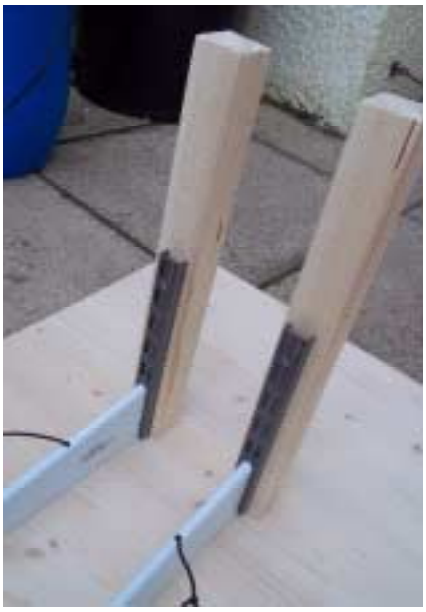
Assembly

Cut two 41 cm lengths of 44 x 44 mm wood, smoothing the cut edges with sandpaper. These are the *outer uprights* and 41 cm is the overall height of the lift illustrated.

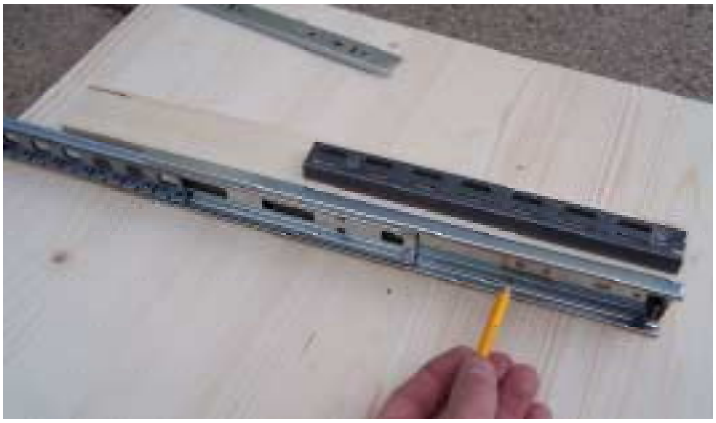
Use a hacksaw to cut the twin slot bracket support in half.

With the cut ends downwards line up a bracket and its support 4 mm from the edge of the *outer upright*. Note that for the feet (large shelf brackets) to be level with the uprights the cut end of the bracket support will not be flush with the end of the *outer upright*.

Mark the position of the holes and attach with 38 mm screws (an extra hole will need to be drilled on one of the supports above where it was cut in half). The second upright should be a mirror image of the first.



Separate the two parts of one drawer runner. Line up the outside section with one leg on a flat surface as shown and mark the positions of the fixing holes. Fix in place with at least three 38 mm screws.



The assembled legs should be mirror images of each other as shown.

Cut the two *inner uprights* of 20 cm from 44 x 44 mm wood. Cut two 17 cm lengths from the ends of the single slot shelf bracket and drill another fixing hole in one of the

halves (making two holes per cut piece, as shown below). Mount these on the *inner uprights*, with the uncut ends of the single slot bracket facing downwards:

Supports should be mounted 4 mm from the edge.

Mount the inner drawer runners centrally on the *inner uprights* on the adjacent face to the bracket supports as shown with 38 mm screws. The left and right inner uprights should be mirror images:

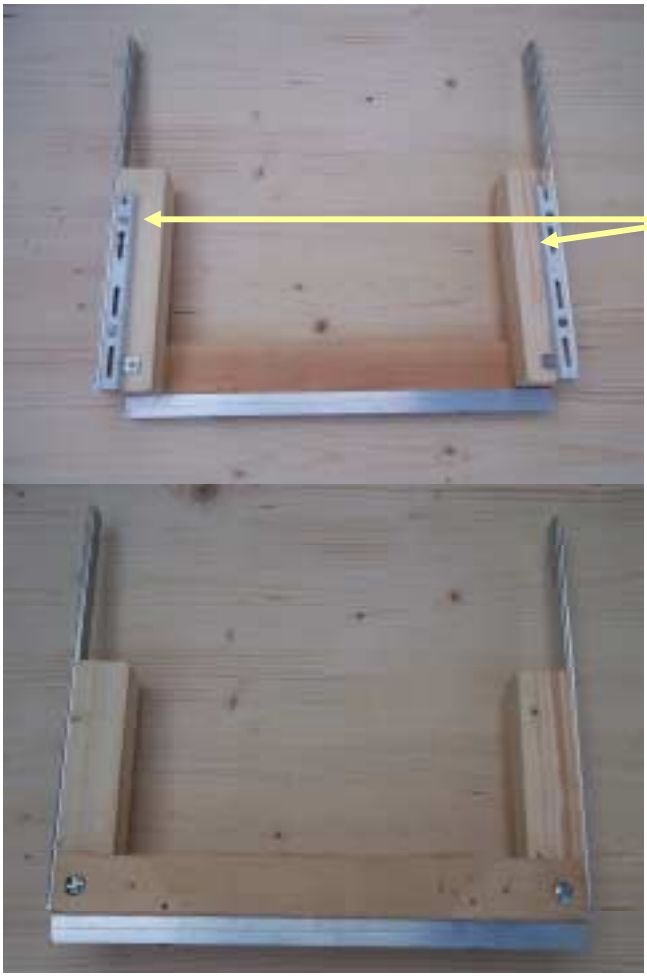
Slide inner and outer runners together on each upright:

They should glide easily on tilting. Lubricate with a light grease if they appear to need it (Vaseline would do).

The assembled upright sections should look like this:

Cut a 390 mm length of square section aluminium tubing. Drill holes approx 8 cm from the ends and pre-drill matching holes in the 390 x 45 x 18 mm softwood piece (the *lower transverse section*). Attach the aluminium bar with 4 cm screws. The holes for attaching the pulley wheel can also be made at this stage.

The *lower transverse section* is attached to the back of the *inner uprights* to make the *inner frame* which will be assembled with two mushroom head bolts as shown in the following front and back views.



a Warré box should fit snugly between the support brackets

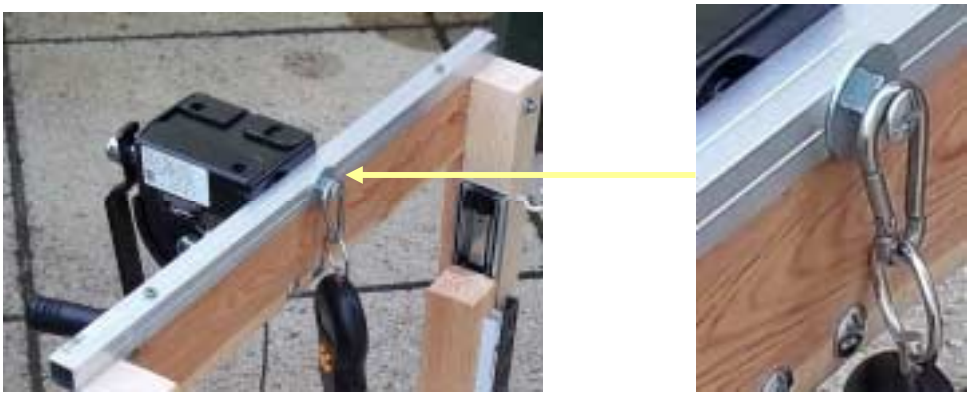
inner frame front

inner frame back

Pre-drill the holes for the bolts. It may be helpful to first line up the *inner frame* against a Warré box of your particular dimensions. The box should sit snugly between the shelf support brackets and against the *inner uprights*. This allows a gap of about 5 mm between each lifting arm and the box for easy fitting of the lift to the hive.

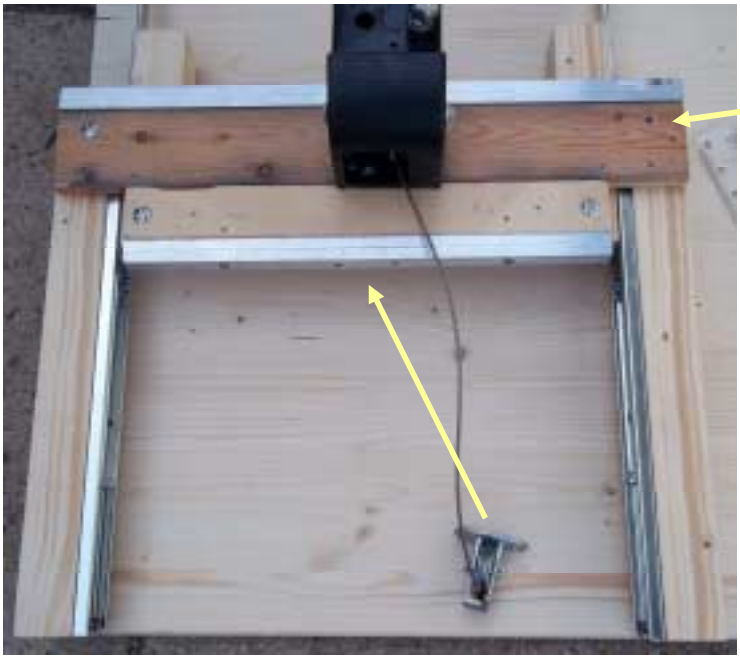
Fit the outer runners to the assembled *inner frame*.

The *upper transverse section* is assembled by attaching a 500 mm length of aluminium tube to the top side of the wooden bar (500 x 68 x 18 mm) with two 60 mm screws as for the lower section:



The winch is attached by three mushroom head bolts off centre so that the lifting wire hangs centrally. The upper attachment bolt passes through the aluminium reinforcing bar and protrudes to allow attachment of the pulley wire or weighing device. The nut and washer arrangement is shown above.

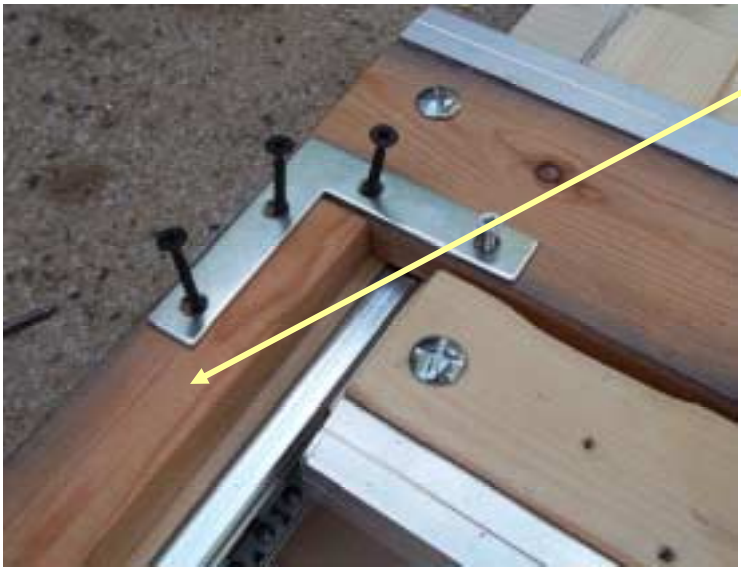
It is critical that the frame is held square while the *upper transverse section* is attached. One way of doing this is to fix the frame temporarily to a square board template. Pre-drill the holes for the fixing bolts with the *lower transverse section* pushed up against the upper as shown:



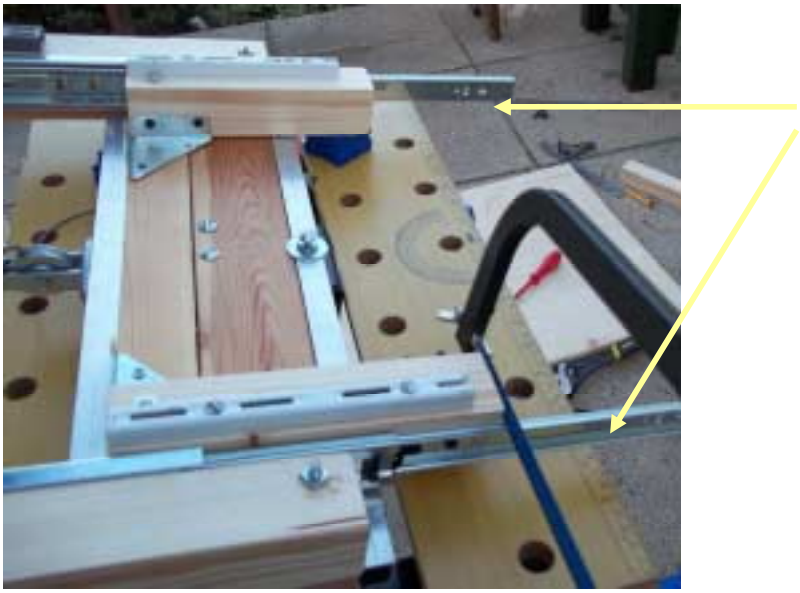
Thread the cable wire through the pulley then the winch, and attach the pulley to the *lower transverse section* with 60 mm screws.

With the frame lined up with or attached to a square template, screw the flange brackets to the *lower transverse section* on the front of the lift frame.

Again with the frame lined up with a square template, screw the corner bracket to the back of the *upper transverse section* and the *outer uprights* via two wooden spacer blocks of 150 x 35 x 18 mm.



Check that the runners still slide smoothly and evenly over the whole 30 cm.
Cut off the excess length from the inner runners with a hacksaw (this can be done earlier).



Attach cup hooks about 9 cm from the tops of the outer uprights. These are a point of attachment for the elastic cord which hold the feet in place while manipulating the lift. Thread the cord through the pre-drilled holes in the feet/brackets and use bowline knots to make the loops.

When used with the weighing device the latter should hang completely clear of the frame and the Warré box.