

MATERIALS (for a 30 disc kite)(10½ diameter discs)

200 feet of 2mm Fibreglass(from Kite and Balloon)
 Thin wall-9 lengths of 12" Aluminium or Brass tubing -2mm bore (obtainable from Aero or Railway model shops,take sample fibreglass to check)
 3½ yards of Ripstop.
 Feathers about 300 required (craft shops sell them for artificial flower arranging,you'll probably need 5-6 packets,there's about a hundred in each but they're not all useable).
 At least 60 metres of braided nylon (50lbs breaking strain preferably).
 Super Glue,Polystyrene Cement,Uhu Contact Adhesive(yellow box).
 4 swivels,1 Aluminium ring(from camping stores)

CONSTRUCTION DETAILS

First cut Fibreglass to these dimensions:-

30 lengths 33"(to make rings)
 30 " 12"(to make cross spars)
 60 " 15"(to make stabilising spars)

Mark 33" lengths at ½", 8½", 24¾" and 32½".
 Mark 12" lengths at ¾", from each end.

Cut Aluminium tubes into 1" lengths.

Join ring by pushing both ends into Aluminium tube,no glue is needed as the fibreglass holds itself in place (the ½"marks help centralising the tube)

Lash the cross spar to the ring with Drimca or any synthetic thread.

Adjust spar to marks as you're lashing and spread small amounts Polystyrene Cement on lashings when complete.

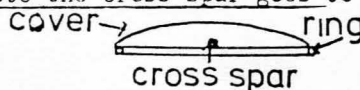
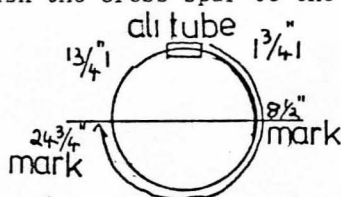
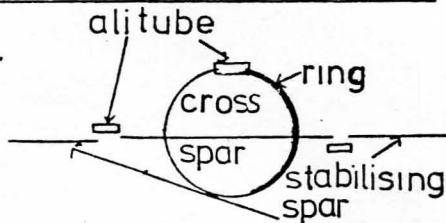
Bind 5 feathers to each stabilising spar.

(balancing isn't important,so long as each tuft looks to have about the same bulk,I'm thinking of using wool from those rug making kits for one of my next centipede kites) and spread lashing with Polystyrene glue.

Cut 30-12" squares of Ripstop.Glue round the frame of the ring and across the cross spar with the Uhu contact adhesive.(Note the cross spar goes to the front or face of the kite).

Try to get a reasonable tauntness in the cover,(it doesn't have to be drum tight but it does make people wonder how

you sewed it on so well) Trim material to about 1/8-3/16 all round,slitting up to frame at cross spars and sew cover round by hand(hides the glueing technique).Now comes the worst job!.Measure off 18-20 metres of line and wind onto a plastic kite handle (a la Peter Powell stunter handle).Pile the discs up in a stack so that you start with the last disc and work to the front (this is difficult to explain)but the idea is that any surplus of line ends up at the front of the kite to be cut off.Tie the first knot on one of the cross spars in a Clove Hitch and then a Reef knot to secure,leave about 6"-9" surplus at the back of the kite to attach curtain ring for tail.Measure 50cms along line and mark with felt tip pen (intervals between discs are 50cms). Repeat the Clove Hitch -Reef knot routine,note where the mark is (in knot, at start,at end this must be the same place every disc you tie off).Carry on till you've complete.the 30 disc and cut surplus leaving about 6ft of line". Repeat for other side.Now measure another 18-20 metres of line for the top line (I think you should mark the top centre of the disc before you start tying any disc off,but I always seem to forget and end up doing it at this stage.Note the Aluminium tube goes at the top of the disc where the knot is tied so that any weight difference tends to tip the disc forward.This is important).



Now tie Clove-Hitch-Reef knot on the last disc, by piercing the cover with a darning needle, mark 50cms and looping the line through the eye of the needle pull a loop through the cover and pass the handle through the loop and then adjust mark on line accordingly, tie off with Reef knot and repeat until the top connecting line is completed (careful on this stage of connecting it is easy to end up with the covers on the back of the kite looking down its length, you'll know if you make this mistake, I did twice!).

Make head (if you hopefully are going to make a head for your centipede I would suggest you use a plain $10\frac{1}{2}$ " disc for trail flight purposes, but the bridling I'll give you is for a $10\frac{3}{4}$ " disc, any deviation from this will mean using the pocket calculator or trail and error). Attach head again at a 50cms interval (head is the only disc with a vertical spar) and then bridle 24" side bridles and 21" top, using Aluminium ring (strong!) for towing ring.

Mark all free ends of stabilising spars a $\frac{1}{2}$ " from end and using carefully Super Glue an Aluminium to each spar to $\frac{1}{2}$ " mark. Super Glue all stabilising spars to cross spars. Make either 2-6ft tails (3"-4" wide ribbon suffices) or 2-6" diameter -12" long drogues and attach to curtain rings using swivels at the horizontal point on the rear cell (a vertical spar on this disc eventually broke the fibreglass at the two points making a horrible rudder, much to my concern and disgust).

Fly it, a gentle wind is best to test fly, lay the kite out into the wind lift the towing ring raising the first disc or three and if the wind is right the discs will lift one by one and its flying. (Avoid strong winds). Fifty pound line is recommended for this size.

Tangles (inevitable) collect all the discs together before and after the offending twist so you have two stacks and just untwist (that took me two months of untwisting full length to work out)

Damaged discs - it will fly with damaged discs, mine had eight before I took it apart to be lengthened.

Be weight conscious it helps in flying in light winds. I could (easily?) wind my centipede up in a light wind.

If you wish to make a larger (disc wise centipede) multiply all dimensions by $1\frac{1}{2}$ you then have a $15\frac{3}{4}$ " disc which I consider is the largest practical size useable with 36" wide Ripstop, and use 3mm fibreglass for cross spars, you then have your own problems with connectors for stabilising spars. I suggest only twenty discs at this size, you end up with twenty seven square feet of sail area, and use one hundred pounds line, N.B. don't try cross and stabilising spars in one complete length because the stringing together becomes somewhat difficult.

COMMENTS ON RUSSELL HALLS - NORMAN BRAGGER

In view of my own past experience and in conjunction with various comments both received directly and/or overheard at Old Warden or elsewhere more recently, I offer the following. It would seem that quite a few people have built Russell Halls and been disappointed to one degree or another with the performance of same, problems being encountered with both stability and flight angle. I built my first one about 18 months ago and experienced just those problems, to such an extent that I was of a mind to write the exercise off as a total failure. The whole thing flew like a plate of rice pudding. Now however I seem to have found the answer. I had been irritated by my first effort and was studying not the construction details in Pelhams but the artist's impression, earlier in the book of a Russell Hall in flight and not until then did I realise that the kite as drawn by the artist had wing stiffeners, running the length of the leading edges, this is clear as a close look at the drawing will show. Also the 20% or so allowance for sail billow is not really adequate. 30% is nearer the mark. A further point in favour of the stiffener theory is the apparent derivation of the design which is almost certainly the flexible wing rocket recovery system. (ED note in Ron Moulton Book of Kites the Russell Hall patent clearly shows no wing stiffeners, but designs can always be improved upon.)