FROM THE ARCHIVES

Menagerie Top Design and Construction

by Raymond Heim, Chippewa Falls, Wisconsin

PART ONE

The above photo is typical of the Menagerie Top layout which we will discuss in this construction article and with the exception of the cage in the center is identical to our layout on the following pages. The discussion going on by the men in the photo is Henry Ringling North with back to camera, and Alfred Court to his right. This photo is of R.B.B.B. Menagerie taken in 1940. From Heist Collection.

Late in 1962 I had some correspondence with Walter Heist in which he advised the possibility of doing some rerun's on my former tent articles in the *L.C.W.* The thought in mind was consideration then being given to a printed publication in which these articles could be given greater meaning through drawings and photos. At that time, I requested he hold up on this article as I wished to rewrite and incorporate some modern methods of construction and generally update the complete article. Time has now passed and we have both a printed *L.C.W.* and an updated construction article.

The following series article is the outcome of that request. At the completion of the tent construction article, you should be able to construct this tent or any other Top of this design. Keep in mind all dimensions given is for this particular Top but the same basic idea of construction is good for any size or scale you might wish to build.

Let me state at this time that after some of my articles were run, many years ago, I received letters somewhat as follows: Please send me information on the construction of all of the tops on the ——— Circus for the year of 19——. Would like to know the height of their poles, no. of seats, etc. An article of this type takes around three months to write from the inspiration until mailing. In self defense, I will have to ignore a letter of this type. On the other hand, I will try and answer any questions on any point possible not quite clear in this or other articles. As to size of tops used by any particular show, I have no information on this and have no means of obtaining it. This is for the circus historians.

A menagerie top was chosen for the first try as this, to me is 90% of a circus. Without a menagerie I feel it is not a circus at all.

To you 100% scalers and detail hounds: This article can be skipped as it will not fill your needs. To the beginner and the model builder who wants a well constructed, serviceable, and detailed top the methods described here will give you just that.

At this time let me give credit to the several people whose ideas and methods were used in whole or in part in the design and construction of my Tops. They are:

Melvin Romeis, Joe Washburn, Mrs. Frank Arnaud, Joedy Loschiavo.

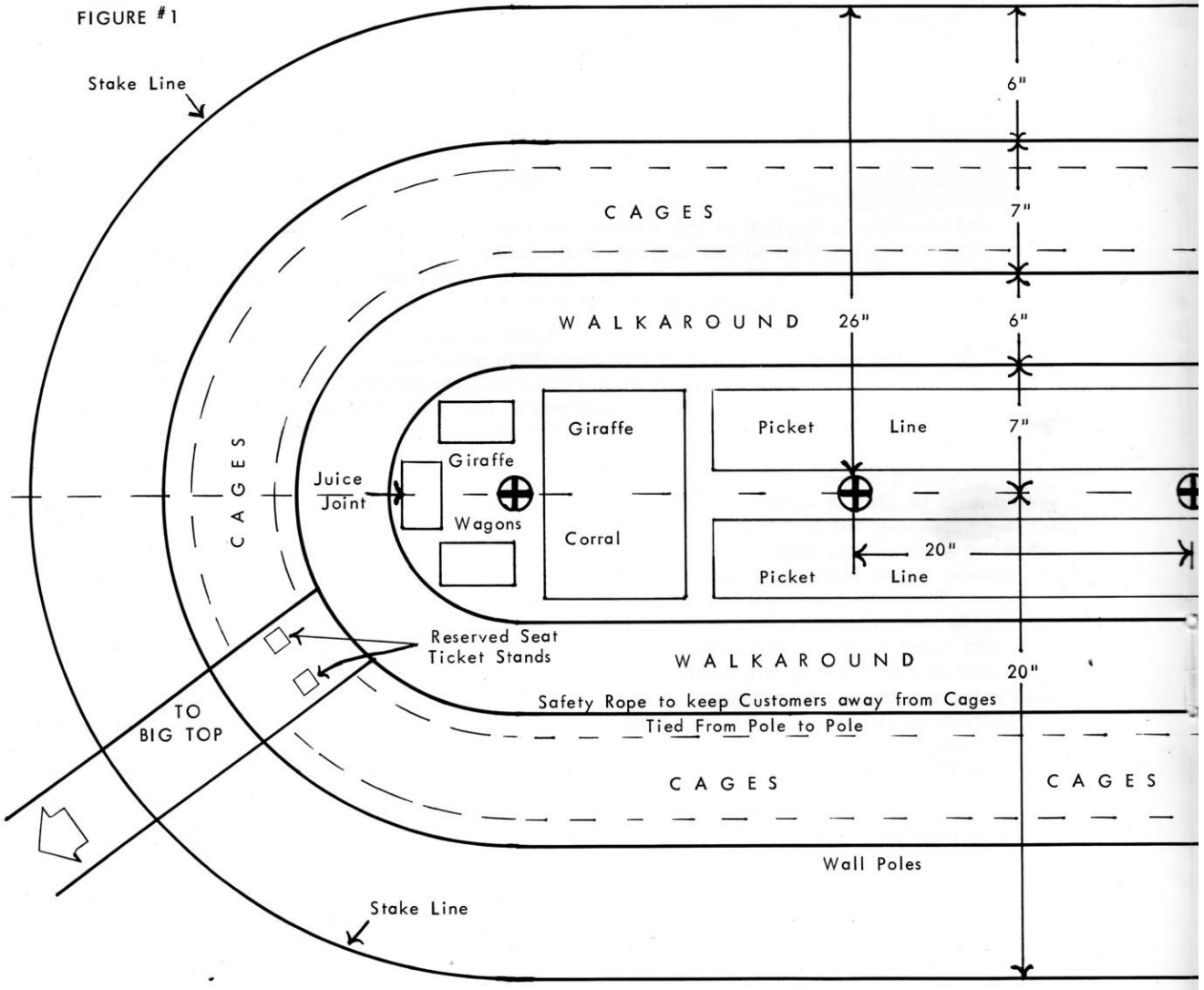
When a show buys or makes a tent they do so with one purpose. This is to provide a temporary shelter over an area of ground of the size needed to fulfill their specific need. In this case to take care of the housing of the menagerie and its contents.

GENERAL INFORMATION ON THE CIRCUS MENAGERIE TOP

In **Figure one** will be seen a typical ground plan of a menagerie of some large shows of the late twenties or early thirties. This could very well be found on Barnes, Hagenback, or Ringling. At that time they all used about the same type of layout varying it slightly to fulfill their particular need. The cages and bull line form the outside oval next to the sidewall with the giraffe corrals and lead stock picket lines in the center between the center poles. Certain exceptions to this was used as with Ringling in the thirties the space occupied here by the nut joint would be taken over by a stage used by the saucer-lipped Ubangis and in following years by the Giraffe-necked women of Burma. Here the nut joint would be moved to the other end by the giraffe wagons. These were always left in the menagerie after the animals were unloaded. Between the outside oval and the inside picket lines was the space for the crowds to walk around to view the animals on their way from the marquee to the connection to the big top.

Another exception to the picket line would be the Buffalo Bill show which had a corral consisting of two baggage wagons forming two sides and wooden fence forming the other two. This housed the Bison they had on exhibition. Cages of performing animals like sea lion and brown bear were placed next to an open area so the animals could be gotten out of the cage back door. This would also include the Lotus' cage on Al G. Barnes as this hippo pulled a cart during a walkaround. Barnes also had another exception to this rule. In their years under Ringling ownership they had a three section cage with the middle section wider than the two others. This would resemble vaguely an octagon with two squares butted onto its opposite ends. One square would be one section of the cage, the other the third section. The front one was used by monkeys and the rear one by chimpanzees. The middle or octagon section housed an ostrich which was ridden by a dwarf clown in one of the walkarounds. The bars on one side contained a door through which he ws let in and out by means of a wooden ramp. I can still picture two husky prop boys pushing the ostrich into his cage up the ramp after the spec. I do not believe in cat cages for the cat acts being placed in the menagerie as most of the shows at that time kept them in the back yard. The menagerie would contain a couple of examples of non-working cats in their respective cages. Other examples of cages not in the menagerie would be the dog wagon which contained the clown goose and clown pig, possible a couple of performing monkeys and any other small animals used in the show not housed in the menagerie, I.E. Bobo Barnetts skunk. Other exceptions would be the sea elephant Goliath and the gargantua cage, during the first year on the road. These also were in the back yard not for public viewing. Any cages containing snakes were kept in the side show. I remember Ringling one year having a tiger they billed as a man eater also in the side show. (1928) On the drawing of **Figure one** the marquee and connection is placed for reference only. They can be placed anywhere as this depended mostly on the lot layout and was differed for almost every lot. Remember all cages

FIGURE #1



were placed in an oval with fronts in the same direction. They should always point in a counterclockwise direction. The back of the first cage in line nearly touching the front of the second cage and so on down the line. As the cage was brought in by horses the first in line was spotted directly with horse power. The pole was then pulled out of the front of wagon and placed under its cage. The next cage entering via horsepower was brought up behind the first until the horses were about to run into the first cage when they made a short turn and stopped. After they were unhitched, the front undergear was turned by human muscle until it was straight in line with the first cage. The pole was pulled and dropped to the ground then one bull was used to move the cage into position while a second on the front left side pushed it sideways into line with the first.

Talking about animals brings to mind a question I love to spring on some of the old timers, who hung around the older shows and think they knew them backwards and forwards. "Do you know where the ice boxes containing the fish fed to the sea lions were located in the menagerie?" Let's hear some comments on this.

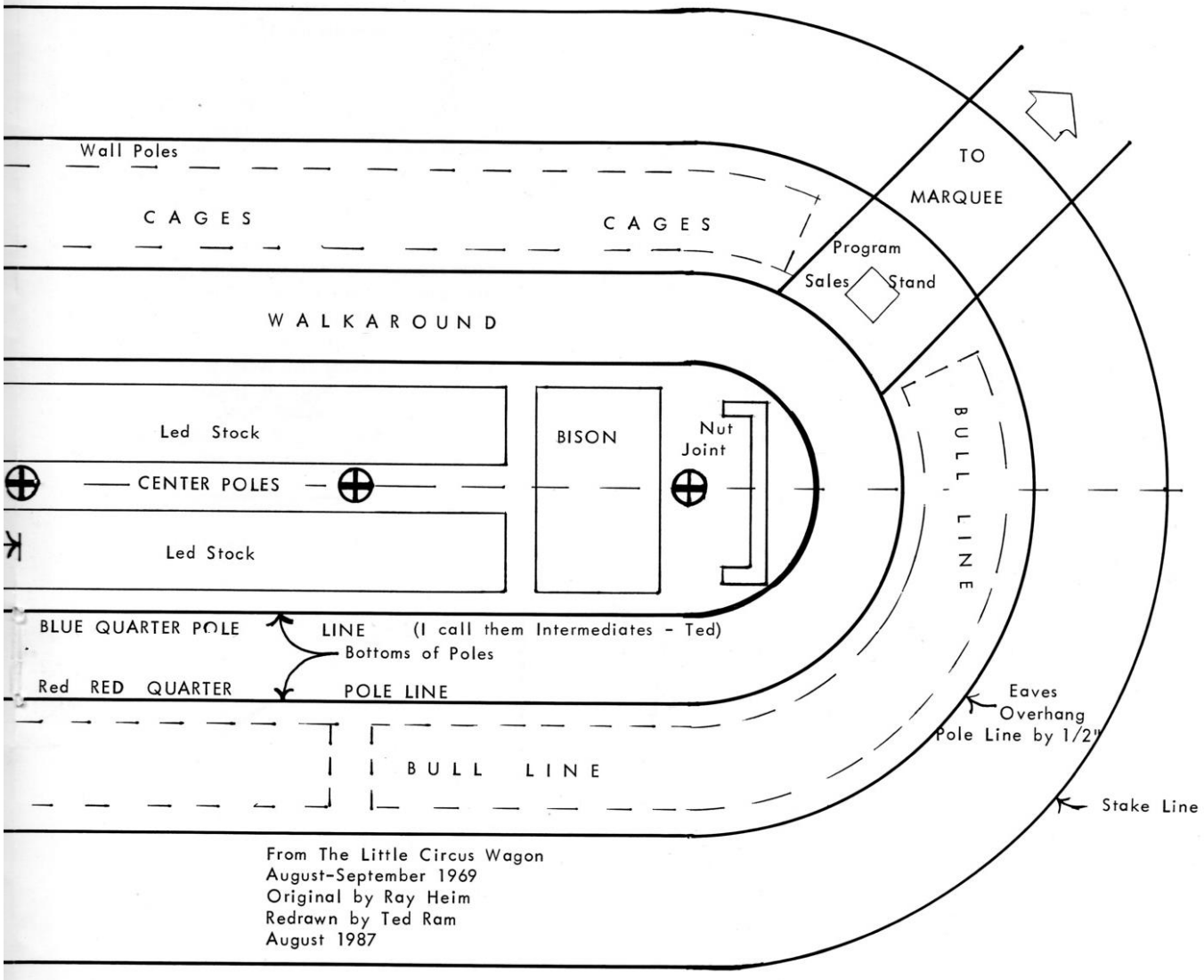
Down to Business

Now down to business and consider what we wish to build. To get the result I wished for (a ½" scale) it was decided upon a long narrow top containing two rows of quarter poles and five center poles. This with the aid of a 6" scale and some mathematics evolved into an 80 ft. round top with four 40 ft. middles. This also necessitated a 5 by 12 ft. baseboard to set it up, which is an odd size but to get what I wanted I could not change. Watch the fellows holler about two rows of quarter poles in so narrow a top and I will agree with them, but I still wanted two rows to obtain the effect I wanted. (Normally a top of this size used only one row of quarter poles.)

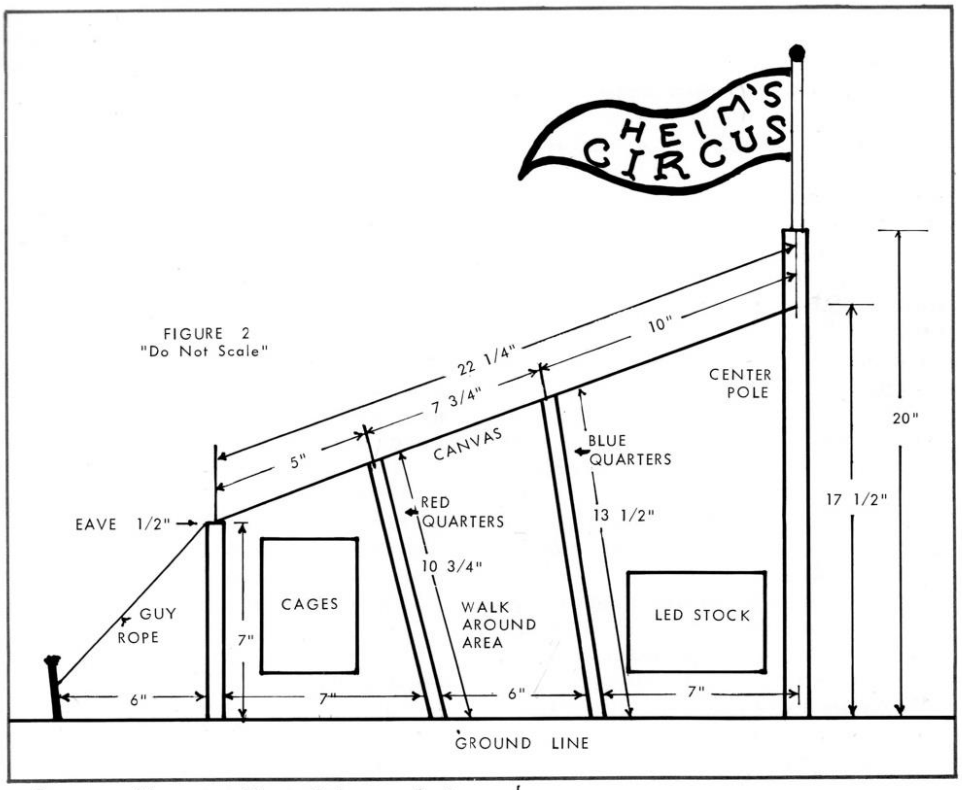
To get the cages in which were both three and four inch widths (in ½" scale) and still leave enough room between the red quarters and the side poles for both cages and a space directly in front for customer safety, a space of about seven inches was needed from the base of the red quarters to the base of the side poles. Next a space of seven inches (14') between the red and blue quarters for the customer walk around followed by a space of another seven inches (14'), between the blue quarters and center poles for the lead stock picket line, the giraffe corrals and any other attractions wished for in the menagerie. This called for a round top of 20" radius or 40" diameter or an 80 ft. round top which is a standard size. Again to get the area needed for the number of cages I would like called for four 20-inch middles scale or 40 ft. which again is a standard size. You who wish a three or four pole top just have to leave out the appropriate number of middles or in the case of a six pole or larger top just add onto the number of middles. From this information you will have to decide on the size needed to fill your requirements.

This will be the top which we will construct in this article.

Let us start by taking a look at **Figure two** which gives an end view of our tent from the center poles outward across the top. To date we have been dealing with dimensions on the ground only and those on the canvas should be ignored as they are just for



From The Little Circus Wagon
August-September 1969
Original by Ray Heim
Redrawn by Ted Ram
August 1987



reference. More on them later and at the appropriate time.

For a top this size there should be four round or pie-shaped sections, to make up the ends. Two on each end laced together. The middles should be laced along the ridge line also from center pole to center pole, lacing in the required number of sections for the top of your length.

Basic Design and Layout

Now let's start the preliminary drawings. Any large piece of paper will do if large enough for a full-sized drawing. Above all do not scale as this drawing **must** be 100% accurate as the subsequent round end design depends upon what you do here. Fortunately, I am equipped with an 8' by 10' drawing board which I use for design and also cutting the cloth. You who haven't access to one will have to use the tried and true modelmakers' workbench, the kitchen table or the kitchen floor. Do not punch holes in the floor unless you want to spend some time in the doghouse after your wife discovers them. A box of candy for a bribe will come in handy at this stage of the game. Take this paper and lay out two lines on it at right angles to each other as lines AN and MN of **Figure 3**. Each line must be OVER 20" long. Be accurate in laying out your 90 degree angle as this is important. Take a trammel (compass) homemade or bought, set it to 20" and draw an arc with point N as the fulcrum and connecting points A and M such as arc ABCDEFGHIJKLM. This figure will be the actual area covered by one-fourth of the round end. There **must** be 11 lines drawn into this segment exclusive of lines AN and MN (**Figure 3**).

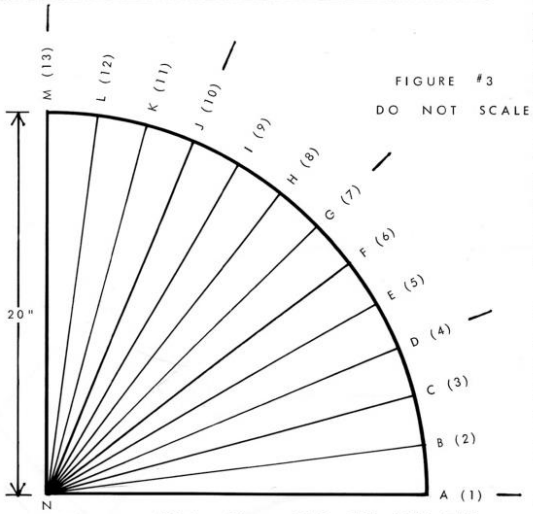


FIGURE #3
DO NOT SCALE

These will be lines BN, CN, DN, EN, JN, KN, etc. To do this take your 45 degree triangle and make triangle AGN by extending line GN from the triangle. Now take the 30-60 degree triangle and construction triangles AEN and AIN. Set the compass to distance GE and measure down to C from E and up to K from I. Draw these radial lines. Next set the compass to exactly half the distance EG and mark for lines BN, DN, FN, HN, JN, LN, along the radius. Draw in these radii (**all Figure 3**) and lay aside.

Now take another sheet of paper and draw a cross sectional view through a center pole as in **Figure 4.** For putting cages or any other wagons in any top in half-inch scale it is necessary to use a 7" side pole. To get a well proportioned top I used a 20" center pole. This gives 2½" on top for the bale ring chains, main falls (pull up block and tackle) guy ropes and ridge ropes. The ridge of the top will be 17½" high at the bale rings. In **Figure 4** QT and OU represent the side poles, P-P1 the center pole, R R1 the blue quarter poles and S S1 the red quarters. The quarter poles are just drawn in here to show proportion and are not needed on your drawing.

A word of caution here. **DO NOT SCALE** any of these drawings. They are purposely out of scale just to prevent this. If you try scaling any drawing for a top the size differential will promote too many errors and the end result will look like something the cat drug in. Again, make these drawings full scale and strive for accuracy or I will be getting a letter saying I am full of you know what, and do not know what I am doing.

Just a note in passing. I have made many tops using this method and they are scattered all over the U.S. (I like to make trades). To date I have still to hear from someone who has not liked the one I made for him. Now back to preliminary drawings.

For the next operation which consists of drawing the actual template you will need a good grade of stiff paper, or poster board. In my case I use artist's poster board obtained at a hardware, hobby, paint or artist supply

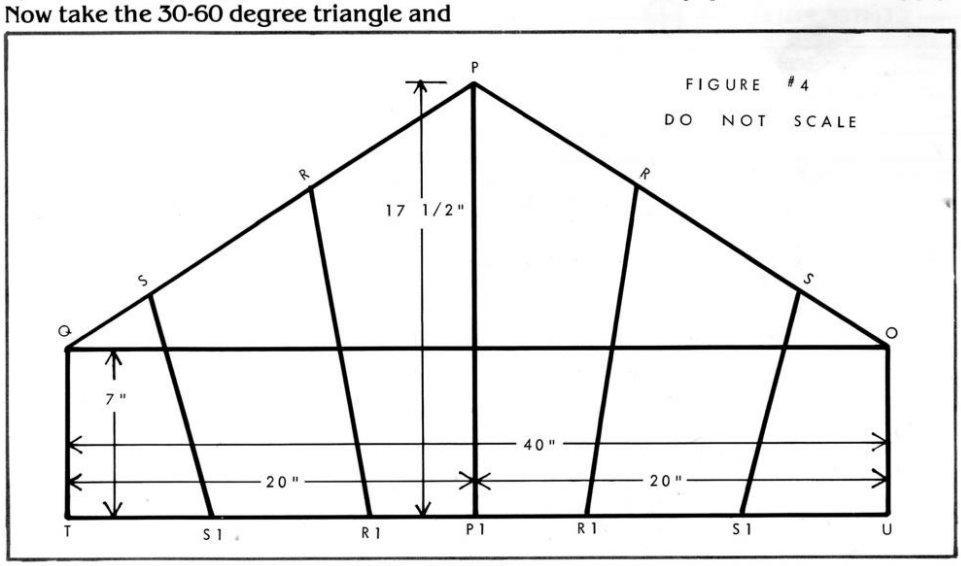


FIGURE #4
DO NOT SCALE

stores. Maybe a piece of Masonite (hardboard) could be substituted by using light colored pencils, but suggest the other method if at all possible.

Laying Out and Drawing Round End Template

At this point we will deviate from the original article which appeared some time ago. This is to bring the lace lines into line. In the original article they were staggered.

We will now start **Figure 5** and will always refer to **Figure 5** for this step unless otherwise noted.

Draw line AB along one side of the template paper and at least 25" long. Draw line AD from pivot point A and at right angles to line AB. Set your trammel to length of line OP of **Figure 4.** Use A (**Figure 5**) as a pivot point draw arc BCD. Part of arc BCD and line AD on this drawing is dotted. You may draw it in solid but is done here for clarity. More of this later.

Referring to **Figure 3** set dividers to distance AB or GF or any other segment of arc AM. They should all be equal in length. Starting at point B of **Figure 5** mark off on arc BCD same number of points as on arc AM of **Figure 3.** In this case 12 points and ending at point C. Draw line AC.

Note that this segment ABC falls somewhat short of being a full quarter circle.

This is represented by the line AC, the dotted section CD of arc BCD and the dotted line AD. These dotted lines were drawn in here just for explanation and will not be used in the template. This is the waste that takes care of the pitch of the canvas and would form a true cone if all four of the pieces you will have to make were laced together without the middle pieces to form a round top like in the days of the one center pole tent. Now back to our drawing. These places you have just marked on arc BC is now shown on the drawing as ends of lines EFGHIJKLMNO.

To avoid confusion later on, mark arc BC distinctly as this is the line on which the side poles will be placed.

At this time you may throw away drawings shown here as **Figures 3 and 4.** They were only used to establish lengths of line OP and length of arc AB. (**Figures 4 and 3 respectively.**)

I might add at this point, that angle A of **Figure 5** will not be a true angle. This is as it should be for formation of conic section mentioned above.

Extend trammel ½" longer than line AB (**Figure 5 again**) and with point A as pivot draw arc 13. This will be the outer edge of the cloth and will be the ½" eave on the top. Extend lines AB and AC out to meet ARC 13.

Measure out ¼" from line AB and draw line 3-4 parallel to line AB. Line AB will be the lacing eyelet line with line 3-4 the very edge. The grommets (eyelets) on a prototype which have the lacing loops threaded through them are called keyholes.

Now measure out ¼" from line AC and draw line 1-2 parallel to line AC. Line AC will be the lacing loop line with line 1-2 the very edge. The lacing loops on a prototype are called keys. On the lots you will hear the various bosses saying "keys to the left". This means the loops are on his left when facing towards the center pole.

Set compass to 1" and with "A" for pivot point draw arc 1-3. This will be the bale ring opening on the cloth. Set compass to 10" and using "A" for a pivot point draw arc 5. Mark distinctly again as this will be the blue quarter pole line. Draw this arc and all contained between lines AB and AC. With a straight edge set at 90 degrees to line 1-2 draw the continuation of arc 5 to line ½. This will have to be done for all of the succeeding arcs drawn also. Do not use your compass to draw all of the way out to lines ½ or 3-4 but use a straight edge on that extra ¼" of line. Repeat with all arcs along line AB.

Divide line A-5 into two equal parts. With the appropriate compass settings and "A" for pivot points draw arcs 7 and 8. Continue out to lines 1-2 and 3-4 as above.

Our next step will be drawing in the radii. Note that all radii do not extend all of the way in to the bale ring opening. This is to avoid a mess of lines at the bale ring opening which is according to prototype. Points EGIKMO only are drawn to meet arc 8. Points NLHF only to meet line 7. Only lines AB, AC, AG go all of the way to the bale ring opening.

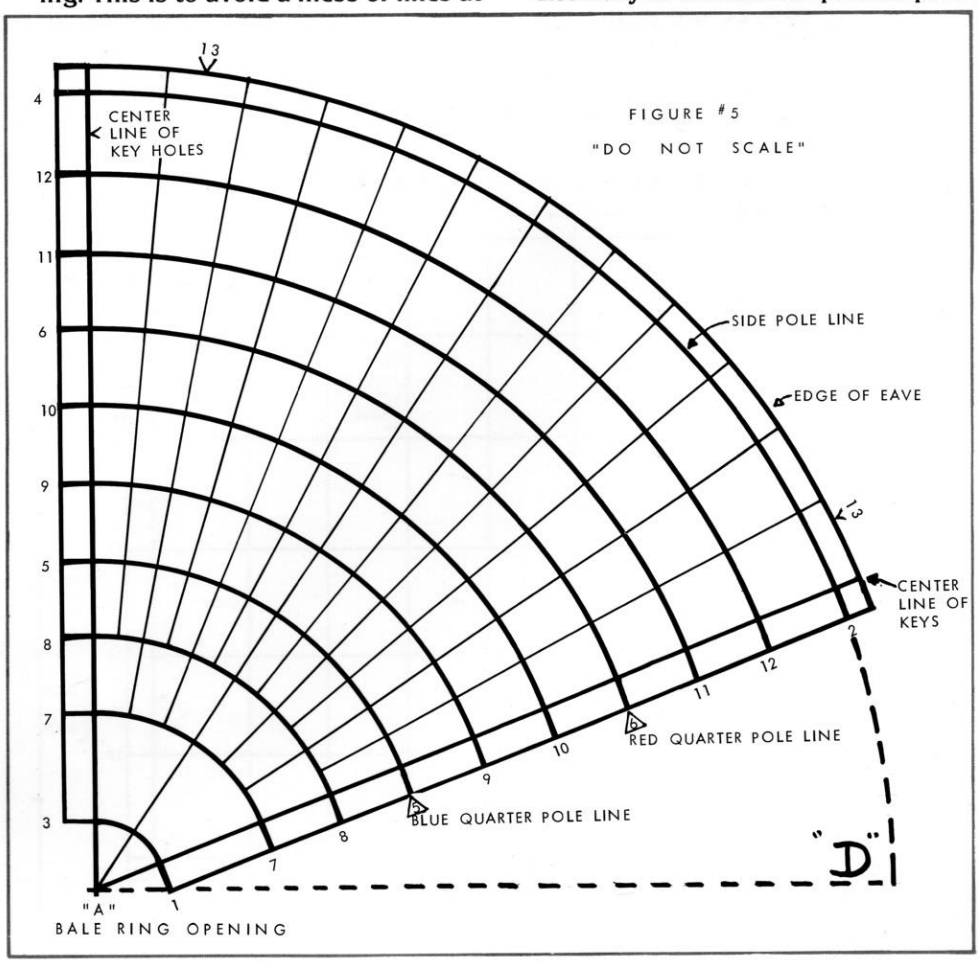
Set trammel to 17¾" and with "A" as a pivot point draw arc 6. Mark distinctly as this will be the red quarter pole line. Divide line 5-6 into three equal parts and draw arcs 9 and 10 with "A" as pivot point and with appropriate trammel settings.

Divide line 6-C again into three equal parts and draw arcs 11-12 as above. Note that these arcs are not spaced equidistant. That is ok as they are that way on the prototype.

Arcs 2 and 6-12 inclusive will be sewed with colored thread on the canvas to simulate the rope reinforcements on the prototype. These will meet with mating arcs on the adjacent piece of canvas and if they were tied with cross ties as on the full-sized top would form the rope (rafters) of the top.

Radii "E" to "O" inclusive will also be sewed with colored thread for the same reason. On the round ends they will be the means of fastening to the bale rings and on the middles will cross over the ridge to meet the mating lines on the opposite middle. On a full size top they would again be tied together with cross ties at the ridge line.

Mark point "A" on the template distinctly as this is an important point



when transferring the template to the canvas. At the time of transferring I poke a needle through point "A" into the template, canvas, and into the drawing board, removing it only when drawing in the radii. A couple of needles placed elsewhere on the template at that time will hold it in place when the needle at point "A" has to be removed for drawing radii. More of this at the proper time.

Now cut out your template leaving excess stock at point "A" so it will be accurately on the template. This can now be laid aside and we will start on the template for the middle pieces.

Laying Out and Drawing Middle Piece Template

We will not refer to **Figure 6** unless otherwise stated. Take another piece of template material and draw a rectangle on it. Two sides will be as long as line AB of **Figure 5** and the other two will be 20" (distance between center poles). This will be represented by rectangle ABCD of **Figure 6.** At corners A and D draw an arc 1" radius. These will again be the bale ring openings. From line AD measure out ¼" and draw line 1-2. Line AD here will be for a lacing eyelet or loop on the mating section with line 1-2 the outer edge of the canvas. Repeat for line AB as shown on line 3-4 and for line CD as shown in line 5-6. Line CD will be the lacing loops line and line edges of the canvas. From line BC measure out ½" and draw line 4-5 parallel to it. Here BC will be the side pole line with 4-5 the eave line and outer canvas edge.

Set template of **Figure 5** on tope of drawing board so that line AC of **Figure 5** is parallel to line AB of **Figure 6**. Transfer lines 5 to 12 inclusive from **Figure 5** to **Figure 6** with a straightedge locating them from line AC of **Figure 5.** These will then become lines 6 to 12 inclusive of **Figure 6.** Mark lines 5 and 6 again distinctly as they will be the blue and red quarter pole lines respectively. Lay aside **Figure 5.**

Divide line BC into two equal parts and draw line 13. Divide line B-13 and line C-13 each into three equal parts and draw lines 14 to 17 inc. There **must** be an uneven number of lines here again as in round end template.

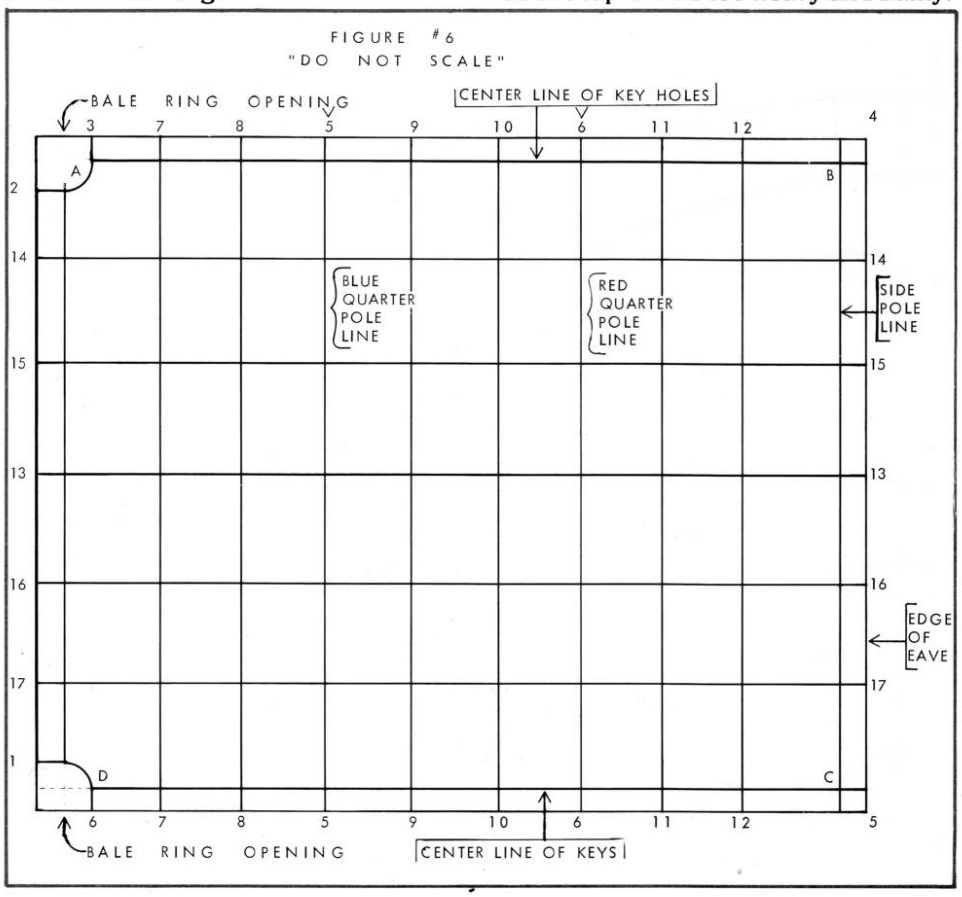
Cut out template as before leaving excess stock at points A and D to keep these two corner points accurately located.

At this time no mention has been made of hems or hem turnunder. That will be taken care of when we transfer the pattern to the canvas.

In concluding this month's article let's discuss materials and tools, so that in the following articles we will be ready for actual construction.

Materials for Construction

CLOTH. I use unbleached muslin. NOTE beginners: **Canvas is too heavy.** This is the nearest commercial we have found to simulate canvas. Do not make my mistake and get it too light as, after making the first top I found it just would not hang right. On the other hand, do not get it too heavy as the top will be too heavy and bulky.



We use what I can only describe as a light medium weight material. What I use sells for around 33¢ a yard and is known as Black Rock brand. If interested, will send sample for a stamped addressed envelope.

Some of you will want to make the inside of the ridges and the patches for the quarter pole socket out of contrasting color. This is ok although I cannot see it myself as the ridge does not show from outside even when opened up. This material can be gotten at the same time as the muslin. The boss calls it a bright red percale.

EYELETS. Our eyelets as well as the setting tool comes from the United Shoe Machine Co. This is the only set we found to do a good job and well worth the money invested. This set uses a hammer for setting the eyelet. They have now made a pliers type setting tool but would not recommend it for setting eyelets under which a guy or jump rope is attached. Two sizes of eyelets are used one of which is a little longer than the other but both are set by the same tool. The address:

S. O. & C. Co. Branch
United Shoe Machinery Corp.
140 Federal St.
Boston 7, Mass.

Eyelets can only be gotten in lots of 10,000 per size. Only around 300 are needed of each size for a top so you could gang up with someone else to keep the cost down. 10,000 of each size eyelet and the setting tool will raise heck with a $20.00 dollar bill. Eyelets are:

SE 43 brass nickel plated
SE 44 brass nickel plated
(each size about $1.10 per 1,000)

The set consists of the following:

1 set Die E L 1 M
1 set cap EL 101 Y
1 set spindle EL 201 Y
1 Gifford set holder USMC
Total cost around $7.50

ROPE. Guy ropes are made out of No. 6 seine twine. I have found this to be about the strongest material obtainable for its size.

Since writing the former article in which Irish Linen was recommended, it has become unavailable. In its place I obtained a cordage slightly smaller than the seine twine. This is used for lacing the top. However I would use the No. 6 seine twine for jump ropes instead of the lighter where in the former article I recommended Irish Linen.

THREAD. Two spools Coates mercerized No. 50 Color No. 155 (tan). Get the larger spool containing 400 yards per spool in order to get the right size thread. At the same time get one spool of No. 50 white.

MISCELLANEOUS MATERIAL. From a hobby store get a bottle of Testor's model airplane dope and a tube of Testor's model airplane cement as well as a small cheap artist's paint

brush (10¢ variety). Use a new brush and not one that has been used for painting or you'll be sorry. Obtain some lacquer thinner to clean the brush. Very little of these items are used but very necessary. More of their use at the proper time.

Tools

SEWING MACHINE. This need not be a fancy or expensive machine. A small portable will do if you do not mind the narrow throat.

BLACK PENCIL. This should be a soft lead for making distinct marks on the cloth. **Keep it sharp.**

COLORED PENCIL. For marking the lines distinctly upon which the quarter poles and side poles are set.

YARD STICK AND SIX INCH RULE. 'Nuff said.

STRAIGHTEDGE. Anything over 30" long with a straight edge. **Do not use a yardstick.** To date I have not found one with a straight edge.

COMPASS AND DIVIDERS. Dime store variety is OK.

TRAMMEL. Here you will have to see your hardware or tool dealer for a set of trammel points. One of them must have provision for inserting a pencil for drawing. The yardstick will do for the beam for the trammel. **Note:** A trammel is just an overgrown compass for drawing large radii. **A string and pencil will not do.**

SCISSORS. A good one for cutting cloth and one for heavy paper. Do not use your wife's good scissors for cutting paper. You have to live with her.

PINKING SHEARS. Not necessary but very good for cutting the cloth. Don't waste your money on those advertised for $4.95 as they are no good. I paid $7.50 for mine. Do not try to sharpen yourself unless you have $7.50 to throw away.

CLOTH PUNCH. For making holes for inserting eyelets. Some of the fellows use a punch that cuts the cloth. I prefer something like an ice pick. For 19¢ you can get an eyelet punch in the dime store at the sewing counter.

EYELET SET. Mentioned above under materials. Place on small 1" board to avoid marring oilcloth on kitchen table.

NEEDLES. One small one for No. 50 thread and one with a large eye to handle the No. 6 seine twine.

No. 8 CROCHET HOOK. Not necessary but useful for lacing top.

DIAGONAL PLIERS. (Cutters) Useful for removing eyelets when you pull a booboo.

NEEDLE NOSED PLIERS. Used along with the diagonals for the same reason.

BRIBES TO GENERAL MANAGER. 1 lb. candy for using kitchen table and anything from 5 lbs. candy up to a mink coat for doing the sewing.

In part two we will start the actual construction as the preliminary work is now done and we are ready to roll. See ya next month. (End of Part 1)

EDITORS NOTE: Please remember that this article originally appeared in the *LCW* 22 years ago. We are not sure at the present time whether the source for eyelets is still valid and we assume that the pricing quoted has changed due to inflation over the years. If any CMB member has current information about source(s) for eyelets and pricing - please send it along so I can pass the information on.

Hagenbeck-Wallace
1934
Set No. 817

550—Loaded Flat Car
551—Loaded Flat Car
552—Cage on Flat (covered)
553—Stringer Wagon
554—Cage cut on flat, Frigidaire Wagon
555—Loaded Flat, cage cut
556—Unloading cage off flat
557—Pullaway team at runs
558—Frigidaire wagon on street
559—Bear cage on lot
560—Elephants on lot
561—Cages on lot
562—Camels in front of baggage wagon
563—Cages on lot
564—Carved reserved seat ticket wagon on lot (side)
565—Five Graces Bandwagon (side)
566—Dog Wagon on lot (covered)
567—Painted Tableau #75 (covered and cages on lot
568—Baggage Wagon #42 on lot
569—Cage
570—Parade Wagon on lot (covered)

21 Photos — $9.25

Send Orders & Make Payments to:
Albert Conover
927 Oakland Drive
Xenia, Ohio 45385

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May/Jun	1976	Mar/Apr	1984	Sept/Oct	1988
May/Jun	1977	Jul/Aug	1984	Nov/Dec	1988
Jul/Aug	1977	Sep/Oct	1984	Jan/Feb	1989
Sep/Oct	1977	Nov/Dec	1984	Mar/Apr	1989
Nov/Dec	1977	Jan/Feb	1985	May/June	1989
Jan/Feb	1978	Mar/Apr	1985	July/Aug	1989
Mar/Apr	1978	May/Jun	1985	Sept/Oct	1989
May/Jun	1978	Jul/Aug	1985	Nov/Dec	1989
Jul/Aug	1978	Sep/Oct	1985	Jan/Feb	1990
Sep/Oct	1978	Nov/Dec	1985	Mar/Apr	1990
Nov/Dec	1978	Mar/Apr	1986	May/Jun	1990
Jan/Feb	1979	May/Jun	1986	July/Aug	1990
Mar/Apr	1979	Sep/Oct	1986	Sep/Oct	1990
May/Jun	1979	Nov/Dec	1986	Nov/Dec	1990
Jul/Aug	1979	Jan/Feb	1987	Jan/Feb	1991
Sep/Oct	1979	Mar/Apr	1987	Mar/Apr	1991

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