

HULL BUSTERS

APRIL 92

OFFICIAL RULE PROPOSALS

by: G.Roberts

1. BB's & BC's with main armaments located all foward of superstructure will be allowed to use an aft secondary battery to mount 1-gun in.

Ship classes affected: Nelson, Richelieu, Dunkerque

2. Large heavy cruisers over 12,000tn and over 55" long could use it's 1/2 unit as an extra 1/2 unit gun.

Ship classes affected: Hipper, Prince Eugen, Takao, Baltimore, and DesMoines

3. Large CL's over 6500tns. get 2 1/2 units replacing 7000tns.

Ship classes affected; Konigsburg, Leipzig, La Argentina, Jeanne D' Arc Adventure, Agano, Sumatra, De Ruyter, Atlanta

4. In campaign battles shore batterys are optional with both sides having identically made guns. Both guns will not be used if one malfunctions.

5. Ships gun magazines will not have the capacity to go over 5 rounds more than what that gun is allowed by the rules.

Endorsers:

C. Pierce, J. Pate, D. Haynes

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Introduction By Fluegel

Welcome to the wacky world of journalism. This issue is hopefully the beginning of an exciting change in our hobby from freon to who knows what. I would like to extend our sympathies to Stan Watkins as his sister died in her sleep. She leaves behind two teenage sons and her husband. Our prayers are so appropriate in this time of sudden loss. I have talked to Stan and he is at peace, because he has a very close walk with our Maker. Just as surely as Stans sister has been born into a new life, a life that we celebrate, we also celebrate with the family of Eric Noble. They are thankful for the life of a new baby girl. Congratulations. Displacement: 8lb. 15.75oz., Length: 20.75", Superstructure: light brown hair. Christened Erica Delight Noble. X



like this by July. There is an Island in the middle of the lake but is to far out to be of any advantage to use. We will be Stringing Plastic milk Jugs together to bouy off the deep sections and to create artificial islands for some interesting boating. If we have heavy rains this year it will raise the lake level another 1.5'. About like it was at the April Spring Regionals. Water in the Lake, 95% of the time is calm with no moss problems at all. Sand bars are now showing but might be underwater by July.

2. WEATHER

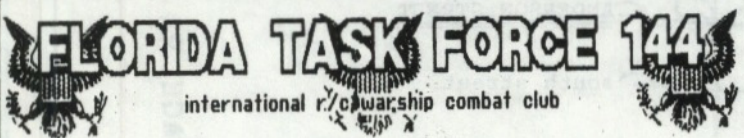
In July, Orlando is usually warm, around 90 deg. with a possible slight breeze to help cool things off. Also at this time rain showers do pop up every once and awhile but only last about 15 minutes then the sun comes back out. Florida summer Sun Showers. Bring Shorts and a hat because it can get hot standing in 90 degree weather for 6 hours.

3. FACILITIES

50 yards from the lake is a Fast Food store with Junk food gallore and restroom facilities. For lunch, McDonalds, Steak and Shake, a Bar BQ Pit and Krystals are about 3 miles away. As far as dock facilities, your Motel room is it. Here in Florida everybody wants to make a big buck so we can't afford to rent a space for this reason. Sorry about that but its the best we can do. There is also no Electricity so bring your rechargeable tools.

4. MOTELS

July in Florida is tourist season so room rates Go Up! The Days Inn everybody stayed in for the Spring and Fall Regionals Jumps to \$ 40.00 per Night plus tax, so we have relocated everybody down the road to the Econo-Lodge on Lee Road. Its about 5 minutes closer to the lake, so the Traffic won't be as bad. The room rates are the best in town,



EUN AND SUN AT THE FLORIDA NATIONALS!

By Greg Wilson

Since we were voted to host Nationals this year I figured I ought to tell everyone alittle about the Lake and what to expect in Florida for the month of July.

1. LAKE DAVIS:

Lake Davis is Approximately 5 acres round. It is surrounded by a 3 foot wide sidewalk that is 20 feet away from the waters edge. It is located in a small niehborhood and is used for walking around only. No swimming or regular boats allowed. The banks are grass that is kept mowed by the city; As of this wriiting the water level is way down, About 2.5' deep 300 feet out. If we have light rains this summer it should stay

\$ 35.00 plus tax for a night. About \$ 5.00 per night more than they were at the Regionals. There are some Do Drop in type Motels but are not in very good shape. They want \$ 32.00 per night and thats there peak season rates (HINT,HINT).

832

ECONO-LODGE
606 LEE ROAD
ORLANDO, FLORIDA
(407) 644-4100

TELL THEM YOUR WITH THE FLORIDA TASK FORCE 144 CLUB!

\$ 35.00 per room per night + Tax.

5. TRAFFIC

Since this will be going on during the week, traffic will be heavy in the morning (7:30 to 8:30) and heavy on the return trip (4:30 to 6:30). Expect at least a 20 minute ride to the lake and a 25 minute ride back to the motel. This is rush hour traffic times so drive safe.

If you wish us to set things up at the Do Drop Inn type motels give me a call. The Econo-Lodge has bigger rooms than the days Inn and is alot cleaner for the Price.

The form needs to be filled out and sent to Me with the \$ 20.00 fee for the Event to cover all Expenses that will be incurred. The frequencies will be set up by first come first serve or we will do what was done in Maryland and have 2 fleets.

Gregory Wilson
 466 Weathersfield Avenue
 Altamonte Springs, Florida 32714
 (407) 774-8666 night after 6 pm.

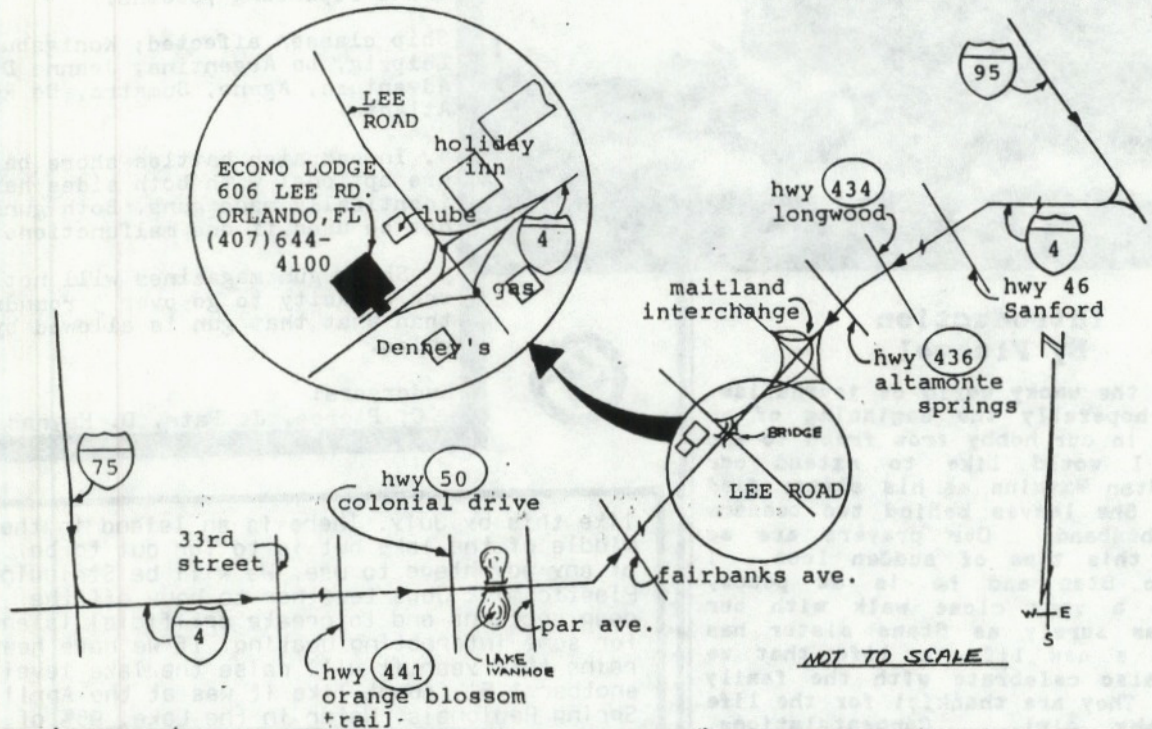
6. RULES

All rules for combat will apply. Speed testing will be mandatory and a chart will be kept. If you are found to be to fast you will be required to fix it and return for a retest. A chart will be kept on everybodys speed and rechecks and will be done everyday if necessary. Ship wights will also be tested.

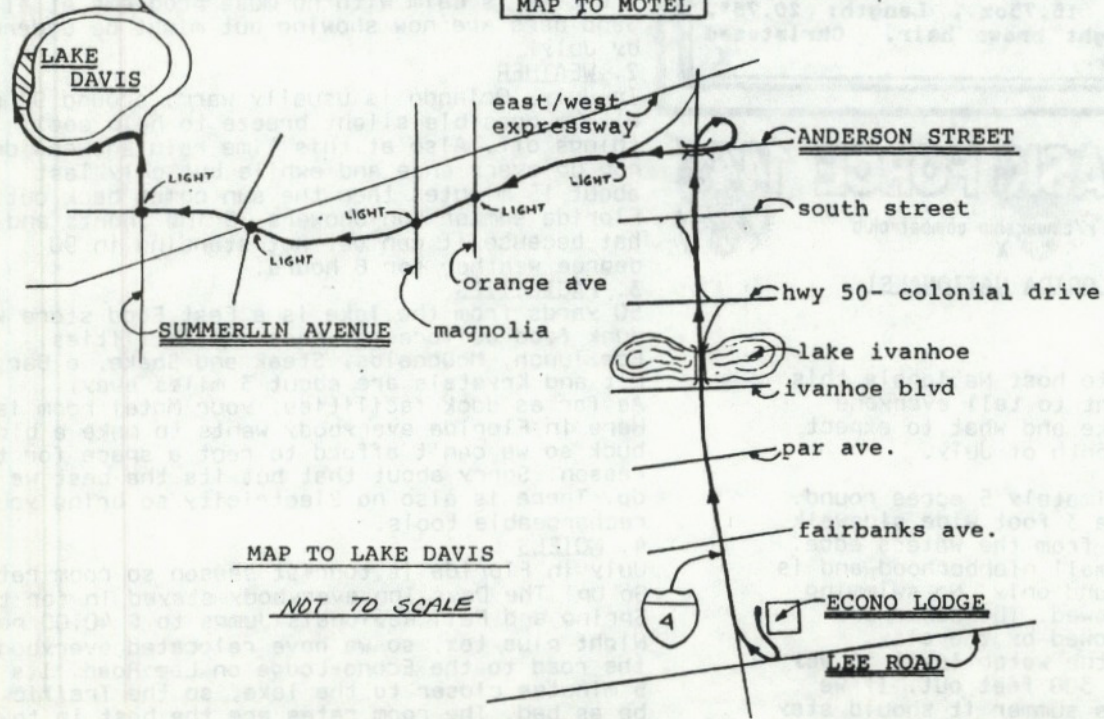
MOST IMPORTANT RULE.

HAVE FUN AND LET OTHERS HAVE FUN. YOU CAN'T WIN A MILLION BUCKS IN THIS HOBBY SO ENJOY GOOD COMPANY A GOOD FRIENDS.

SEE YOU ALL IN JULY! X



MAP TO MOTEL



MAP TO LAKE DAVIS

NOT TO SCALE

FLUEGEL Friends don't let friends battle Allied.

NATS INTRY FORM ON PAGE 849

Allied Fleet Disbands

by Vern Dernberger

April 1, 1992 - It was announced today, at a special meeting of the Executive Board Security Council, that the Allied Fleet would disband, effective immediately. Allied officials stated that the arms race that had been pursued over the last 15 years was the primary reason for their decision. Continual increases in systems development and hostilities by the Axis Fleet required the Allied Fleet to invest substantial resources to maintain the status quo. However, following two full years of defeat, Allied officials had begun to question whether or not such investments would ever pay off and have removed themselves from the race.

Marty Hayes, President of the IR/CWCC and long time Allied captain, said that "the demise of the Allied Fleet makes me both sad and happy, sad because there will no longer be any classic Allied/Axis conflicts, but happy because ex-Allied captains will now have a chance to participate on a winning team." Although no official word has been released, experts believe that regional fleets will evolve to fill the void left by the Allied Fleet. For at least a few years, regional conflicts will occur and there will be a general period of unrest. However, experts expect that within 5 years the situation will stabilize, leaving 3 or 4 regional fleets, with the Axis Fleet serving as the primary peace-keeping force around the world.

Herr Fluegel, Gross Admiral of the Axis Fleet and the Vice President of the IR/CWCC, explained why he thinks the Allied Fleet finally yielded to the tremendous pressure generated by the Axis Fleet. "Technology and Teamwork", he explained, "By pushing the state of the art over the last 15 years, we forced the Allies to invest far more resources than they could afford ... we also dramatically improved our ability to operate as an effective team, increasing the pressure even further." One example of the type of research and development that Fluegel mentioned is the Magneto Gun (see other article) which is far more advanced than anything that the Allies could develop over the next 5 years.

Surprised by the monumental announcement, Jim Pate, one of the shining stars in the now-disbanded Allied Fleet, stated that he would probably "recruit as many good captains as possible" in an effort to build a new fleet. "I just can't stomach the idea", he said somberly, "of allowing the Axis Fleet to walk away with a victory like this. If necessary, I'll sink every Axis ship myself." Similar remarks were made to this reporter by Steve Baker, Greg Wilson and Paul Broring, all of whom are young, aggressive, ex-Allied captains who don't think it's time to quit. Steve Baker added that "perhaps one of the problems was that we never had a full-time Grand Admiral who could provide us with the leadership that is necessary to defeat a well organized and equipped team like the Axis Fleet." Steve Andrews, the Allied Admiral at NATS '91, said that he welcomes the opportunity to reorganize the Axis and Allied Fleets. "I have always wanted to battle alongside some of the Axis captains", he said cheerfully, "now I might get my chance".

As usual, Axis captains were reluctant to rub salt in Allied wounds. Will Montgomery, one of the most feared Axis captains, said that "the Allies always provided a good battle" and that

he "would miss the good natured competition". Similarly, Lief Goodson, the most diplomatic Axis captain and the Secretary of the IR/CWCC, stated that "it was always a shame that we categorized people as Allied or Axis. After all, we are all basically the same and now maybe we can live in peace." He continued to say that he would remove all the guns from his soon-to-be prize winning Bismarck, allowing it to serve as a "flag-ship for peace" in the new world of cooperation.

Other Axis captains were less diplomatic in their response to the news. Gerald Roberts, the 1991 Von Fluegel Winner, said that he would "continue to sink Allied ships whenever possible, despite political changes". "We hate Allies", said Nathan and Mike Blattau, two of the most aggressive Axis captains ever seen in the hobby, "and we'll continue to fight them anywhere, at anytime."

Frank Pittelli, the leader of Tri-Pact, said that Tri-Pact is examining everything that has happened recently and will determine how they fit into the new world order. "Tri-Pact is extremely loyal to the Axis Fleet", he stated strongly, "but we see a lot of opportunities in the future for a close knit team of skilled, aggressive captains." He also announced that Tri-Pact would consider applications by ex-Allied captains on a case by case basis.

For now, the only certainty is that the Allied fleet no longer exists. Clearly, the Executive Board and all IR/CWCC captains need to reflect on these monumental changes and determine for themselves how best to proceed. Although this is a sad moment for some Allied captains, it is also a time to welcome the tremendous advances that will be possible now that the 15 year old war between the Allied and Axis forces has come to an end.

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**"ALL I WANT FOR CHRISTMAS
IS MY TWO STERN GUNS"**
By Ron Thibault
12/11/91

So now that you read my previous article you know how to tweak the pistons in your guns. Yes that was my article and regardless of what Fluegel says it did have my name on it when I sent it. I have the computer file to prove it. This is all well and good you say, but I don't have any guns! This article will tell you how to build some.

For those of you who have never worked with brass before, a note of caution!! Drill bits and other cutting tools have a marked tendency to grab when working brass. Always have the pieces firmly clamped down, and always feed slowly. Do not attempt to drill out the 5/16 holes in this article with a drill bit!! If you do not have a lathe I also recommend against using the end mill. When I first tried to make a gun using a 5/16 drill bit, the drill grabbed the fitting and spun an unclamped 40 pound drill press vise around on the press table.

If you have a steady hand and a large dose of masochism you can do all the steps with just a drill. However, to retain your sanity, you should have at least a small drill press. The drill press will quickly become invaluable for other projects once you have acquired one! A small (1/2 inch, 5 speed) drill press runs about \$100-\$150 from a store. A larger (5/8, 12 or 15 speed) drill press runs about \$180-\$250 from one of the "Tool Warehouses" like "Harbor Freight".

Besides the drill press you need the following tools: some sort of vise for your drill press (preferably the type that has a way of

adjusting the vise body position forwards or backwards and side to side while the base is clamped to the table), a good size file, a 3/16 drill bit or rod, and a Dremel 5/16 cylindrical cutting bit. I believe it is the larger of two that Dremel offers.

If you plan to use the adjustable vise, or can afford a few more bucks, get a larger bench drill press. The adjustable type vises run about \$40-\$50 and a plain vise \$9-\$40 from the same tool warehouses. If you get a small press try to get a 3 inch plain vise, the 4 inch vises are a little to large to clamp to the table.

If you have a lathe, you are all set. With the lathe you can chuck the compression nut in the lathe and screw the fittings into it. For the lathe I recommend that you use a 5/16 inch end mill (it looks like a regular drill bit but has a flat end and four flutes, spiral things, rather than two), instead of the Dremel bit. Unfortunately, the right angle restrictors described later would be a pain to do on the lathe.

You need at least one brass "T" fitting for each interrupter, and a fitting for each restrictor. For the restrictors you have a choice between two "flavors". The unions used to make the restrictor come in either straight or a 90 deg elbow. The Advantage of the elbow fitting is that it takes up less space in the turret, because you do not need to curve the tube into the restrictor to make it level. The advantage of the straight fitting for those of you with a lathe is that you can screw it on just like the "T". The elbow is best made on the drill press.

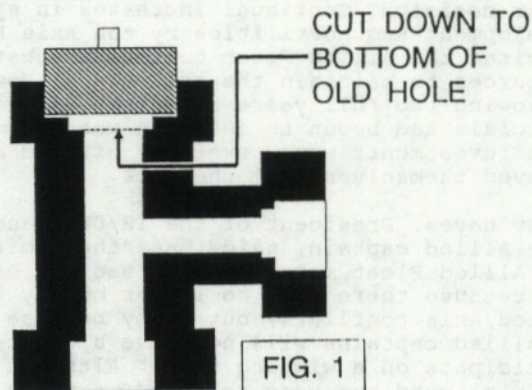
I recommend that you buy at least twice as many fittings as you need to allow for waste and also so that you can make extras for future use. I also recommend that you make both types of restrictors. Having a choice may come in handy when installing the gun. For example the twin stern gun installation on my ship required one of each so that I could stagger the interrupter assemblies but still have the adjustment nut exposed.

Although the piston should be made after the "T"s are bored out I will describe this process first, as it is the simplest. To make the piston the simplest method is to use a stainless steel nail. These are typically available at a marine supply store. Take a "T" fitting with you and get the size of nail whose shank is just small enough to fit inside the "T" (the 3/16" portion). Buy several nails and/or prescreen them, and only use those whose heads are relatively round and true to the shank. An off-center head is almost impossible to properly file true. Cut off the end of the nail with the head on it making it longer than the "T" fitting (use a cut off wheel). Chuck the cut end into the drill press and file the ridges on the shank down so that it fits into the "T". At the same time square up the inner edge of the shank/head joint. Now file the edge of the nail until it will fit into the bored out portion of the "T" without binding.

When filing the nail, hold the file by the end opposite the tang and hold it against the piece so that the file is being pulled away from you. This way if the file catches it will be thrown away from you. Also have patience. S. Steel is tough and the filing will go slow.

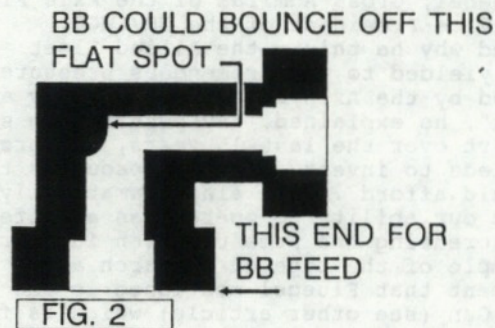
To bore out the "T" fittings we first need to position them. Chuck a 3/16 straight rod or drill bit into the drill press. Lightly clamp a fitting in the vise using a compression nut on the clamped end, if necessary, to protect the threads. Position the fitting/vise assembly on the table and clamp everything down with the rod inserted into the fitting. Do this with the drill press chuck run down so that you can later raise it to insert the cutter. This positions the fitting inline with the drill press shaft. This step is where the adjustable vise comes in

handy, especially if you don't have twelve hands. You may be able to unscrew the fitting from the nut when done and just screw in the next fitting, but use the rod to check that the next fitting is still square. Remove the rod and insert the 5/16 cutter. Running the press at the lowest speed, slowly grind out the end of the fitting until you just hit the bottom of the old hole (see figure 1). Cutting any further will likely weaken the fitting or even cut out through the bottom of the threaded area.

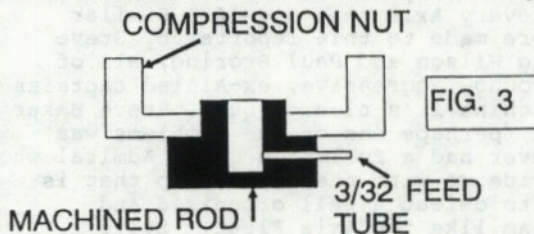


Those of you with lathes can chuck a compression nut into the 3 jaw chuck and just screw the fitting into the nut. As each one is completed unscrew it and screw in the next one.

The straight unions are made the same way as the "T"s. The elbows, however, are slightly different. The first thing you have to check on with the elbow is the internal machining. Check for any edges that might catch the BB and keep it from going through consistently (see figure 2).



Most of the elbows will have some kind of obstruction. The trick is to determine which end the BB can enter into and bounce off the obstruction without bouncing back down. After determining the end of the elbow the BB should enter, bore out the other end. The process is the same but each elbow will have to be clamped individually and probably can not be done productively on the lathe (no way to hold it in the 3 jaw chuck, a pain even in a 4 jaw).



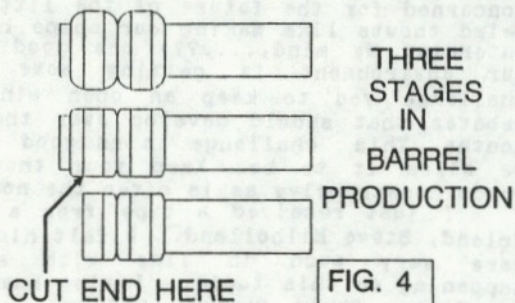
Now you need to make the bottom of the interrupter assembly (the nut that holds the piston in place). The easiest way is with a lathe. Chuck a piece of solid brass rod, larger than the hole in the nut, in the lathe and turn one end down until it will slip into the hole. While the piece is in the lathe, drill a hole, for the gas entry, in the end deep enough to reach into the uncut section. Cut off the piece and drill one (if no gas feed to the magazine) or

two 3/32 inch holes in the side or bottom. Insert two pieces of 3/32 brass tube into the holes, the piece into a nut, and solder the mess together (see Figure 3). You are less likely to get solder in the threads of the nut if the nut is on the top during soldering. I use a brick as my fireproof surface. Make sure that there is enough of the machined end inside the nut to act as a bottoming surface for the piston.

A nonlathe method is to again use solid rod but drill out the hole in the nut for the rod. Drill a hole in the rod end for the gas entry and the hole(s) for the feed tubes. You have to be careful in soldering the pieces together as there is no handy shelf to keep the nut from falling down on the rod.

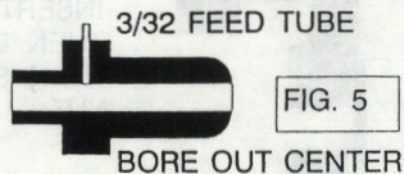
Another method would be to solder a plate on the end of the nut, drill and tap the plate for a screw, and use the screw as the stop. The main problems with this are that adding the feed tubes is difficult, strength of the screw/plate attachment is questionable, and that sealing the screw presents difficulties.

If during the tweaking of the piston you



find that the rod sticks too far into the nut you can grind it down. Bore out a scrap "T" or union. Cut off the bored end so only the threaded portion remains. Screw this into the nut and clamping it in the vise and use the Dremel bit to remove some of the rod. The cut end will protect the threads on the nut.

The next piece to be made is the barrel (see Figure 4). I use a double thick brass tube



bought from Campbell Tools Co., 2100 Selma Rd., Springfield, OH 45505, (513) 322-8562. Their part name is Brass Tubing Half Hard very sturdy - 1/4", and costs about \$2.10 for a 1' section. This will make 3 4" barrels. This gives better ding resistance under fire. Otherwise solder two sizes of regular tubing together for strength. Figure 4 illustrates the following steps. Take two of the compression rings from the fittings you bought and solder them on one end of the tubing. Chuck the assembly in the drill press or lathe and file/turn the outside of the rings down so that the barrel will slide smoothly, but not loosely, into the restrictor. Cut the assembly at the edge of the slope/flat joint the end ring to leave a flat surface for the o-ring. Be sure that this cut is square or the o-ring will not be properly compressed. Note that the Dremel bit is slightly smaller than 5/16 so that barrels and pistons made for fittings bored with a 5/16 end

SOMETHING TO THINK ABOUT By Fluegel, Dirty Dave Haynes, and Steve Milholland 3 / 21 / 92

I was disappointed to receive the news that Dirty had shared with me by cassette tape. I felt it was so important that every combatant should have the news as soon as possible. I imagine that Dirty won't mind that except for a few "uhs", this article is verbatim from his tape.

"As of July of 92 it will be illegal for any type of freon to be vented intentionally. When we are working on any type of system we can not just blow the freon into the air, and if you do and are caught then you can be subject to a fine and that includes R11, R12, R502, R22, any of them.

"I found this out from both of my supplier here, as a matter of fact, soon after that you are going to have to be licensed to buy refrigerant. I'm going the 21st, I believe of March, I'm going to SantAngelo to a seminar, at the end of the seminar there will be a test and if I pass the test they will give me, not a license, but a permit so to speak to buy freon and if you go to a place that sells freon and you don't have that permit, then you can't buy freon.

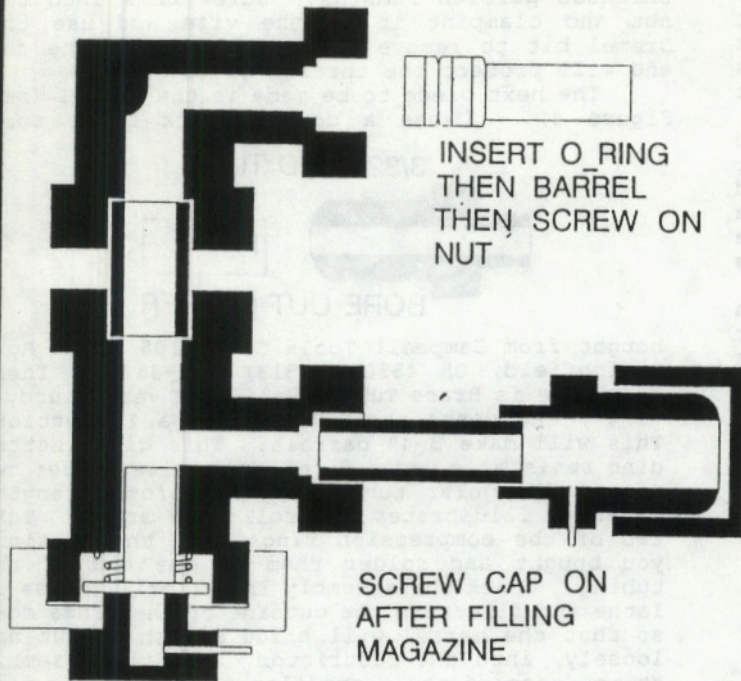
"That's July of 92, so our Nationals are going to be....looks like our Nationals are going to be it for freon. After that its going to have to be compressed air or CO2 unless you want to risk paying a hefty and I do mean hefty fine for venting freon which we do when we fire our guns. I noticed in the HULL BUSTERS that deal about going to CO2 and I guess its here; that doesn't leave us an option. If we are going to battle we are going

to have to do it with compressed air, those little compressors, or CO2 or what ever kind of gas we can come up with

"So my friend, I thought I would put this to you since you're up there on the E board, and this is official, it isn't hear say any more, its for real. The suppliers have been notified which is why one of the suppliers in SanAngelo is hosting this seminar so, I guess all my work on my Kongo here....this will be its last go around. It was modified with bigger newer tanks and after July it will be no more. So, you know the funny thing is, one of the odd things is that R22 has never been proven to do anything to the ozone layer. Any damage that it might of caused is theoretical...they think it MIGHT. The others they have shown that it could. R12,R502, and R11 something in there make up causes them, that's a pretty definite deal.

"R22, however, has never tested out that away, however, since it's in the fluorachloral family there taking it the same route that there taking the other refrigerants. So, old buddy, old pal, crank up the compressors or fill up the CO2 if your going to battle after July. I thought I should let you know before I send any kind of article in (Dirty, I felt this needed to go out this issue, I hope you don't mind that I made an article out of you tape.!).

"Gerald and I where talking and R22 is getting a bum-rap so to speak because of its environmental hazard and people I talk with, a representative of Dupont whose freon is their brand name, any other refrigerants use a different name, but there all called freon. Freon is actually a trade name of Dupont Co, at any rate, he told me the same thing, freon 22 has not shown at all to be a detriment, the others have but because 22 is in that family, a refrigerant, there taking it along with the rest of them. I guess its going to cost everybody to do the change over. We will have



mill will not fit!

The last piece needed (other than various tubing for magazines and feeds) is the magazine fill fitting (see Figure 5). I use a sweat-on air conditioning fill valve. It resembles a tire valve. Remove the valve core and drill out the center to 3/16 inch. Drill thru the side below the threads with a 3/32 inch bit for the magazine gas feed. Insert a 3/32 brass tube into the hole and solder the assembly to the magazine, and also solder the tube to the fitting. Run the 3/16 bit down into the assembly again to clean it out.

A drawing of an "assembled" gun is included. You now have all the pieces you need to assemble your guns. As a special note all Axis are advised to be sure to hammer kinks in their feed tubes and magazines. This greatly improves performance!!

result was worth it, and nobody quit the hobby or had any big headaches about it. In fact, it was kind of fun! Like Dirty, I am concerned for the future of the little ships. Weird thoughts like making our ships bigger are entering my mind,....??; one good thing is our environment is getting some help. I challenge you to keep an open mind to the debates that should develop over the next 10 months. This challenge is as good or bad as we allow it to be. Keep your thoughts and words constructive as is often the norm.

I just received a tape from a dear old friend, Steve Milholland. I felt his comments were very much in line with activities happening on this topic. I also have a guest co-editor, Chris Pearce, helping me. Chris types at a blinding speed, so he helped us by adding Milholland's experiences to Dirty's. Once again, this is verbatim from Milholland's tape.

"One thing that I have known for some time, and I assume that, unless they are like an ostrich with their head in the sand, everyone else in R/C Warship Combat knows it, and that is that Freon 22 is eventually going to be on its way out. They're either going to stop making it entirely, or they're going to pass legislation where we can't buy it, or it's going to be literally priced out of the market.

"That's already started to happen here - a couple of years ago, I could buy a 30 lb. bottle of R-22 for about \$45-50. Now, the price here is over \$100, and it's getting to where you can't afford to buy it. I know there are some states in the Union where I have sold my Skunkworks ships, and people have called me and said there are laws in their state that won't let them buy it. The wholesalers there literally will not sell to anyone who does not have a license, at any price. I have had to refer them to other states where they may have had to travel a little while, but they have been able to get their hands on it.

"In light of this, knowing that there's a clock ticking away, there's got to be an alternative. I know a lot of people are working with CO2, and I would dearly love to see a good, convenient CO2 system developed, something that is commercially available, or that I, as the owner of Skunkworks, could make commercially available, something that is small enough, light enough, compact enough, and cheap enough to use in a cruiser; and so far there just isn't anything. I have seen the article written by the gentleman from California on a CO2 system, but that is just totally unsuitable for cruisers. It's too heavy and too bulky, and the amount of parts and labor that would go in to one - I just could not afford to make that unit and sell it for a cruiser. Now for a battleship, maybe,

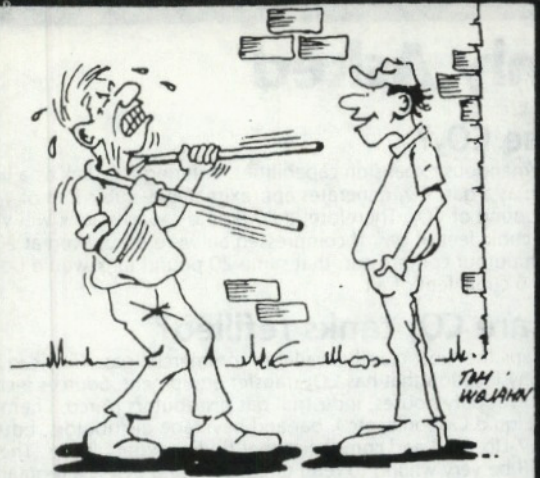
the old tanks hanging around that we can sell as scrap copper. I guess because if we use CO2 we won't be able to make our own tanks. If you use compressed air, it will still be feasible to use your own tanks because you won't be using near the pressure of CO2 but any way, that's something to think about on building your new Bismark.

"I have been reading up on CO2, I did get the Ship Modeler magazine that said how to build a CO2 gun system so I will be checking that out and I will be checking out local supply places on valves and checking around on where I can get those 10 or 12 oz CO2 bottles to put in my Nagato since that will be my next ship and that's the way it is, it's not a deal you can choose; oh I guess you can risk the fine, I think they said it causts something like \$500 per pound - with us they wouldn't really know how much we vented.

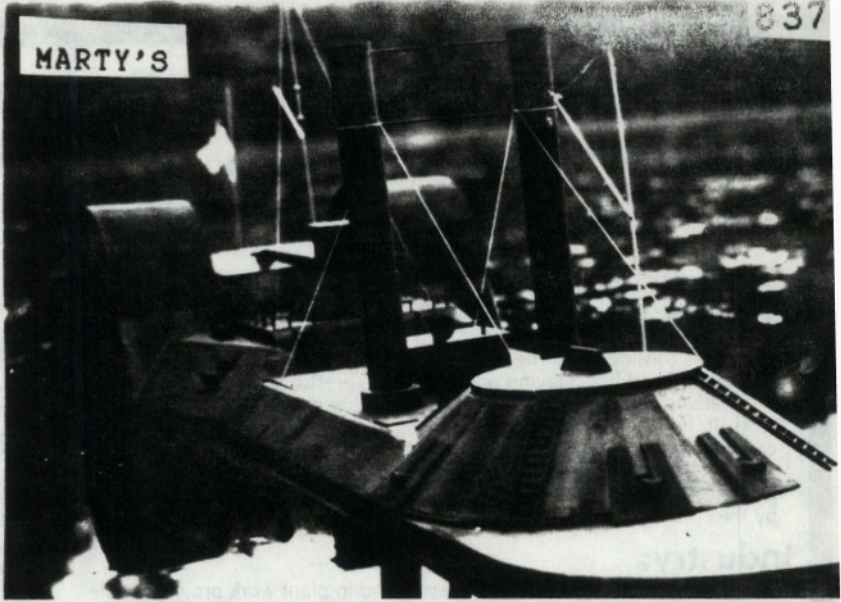
"So old buddy old pal, were going to have to put on our design caps and start inventing some compressor or CO2 systems for our ships. You know the sad part about that is getting something small enough for cruisers, light cruisers and destroyers. It may be pretty tough and I'm afraid that it may put out some ships when that change over is going to have to be made. Maybe one of our engineering wizards may come up with a system, I'm certainly hoping so. I'm not worried about it right now, but it's here, I suspected that it might be.

"This publication is by Dupont. They talked about the EPA, anyway how about those apples. Anyway, life goes on. I'm thinking on going with the Nagato with CO2 for the simple reason that an air compressor won't keep up with the rapid fire, especially if your firing twins or triples, but that's down the road, that's next year, that's after this Nationals, when building season gets back in earnest".

Thanks Dirty for the news. At first blush it is disappointing, but it reminds me of the days when we had to all change our spurt guns to single shot guns. It wasn't a happy prospect, but we joined together and published a lot of ideas, both good and bad. The end



"Still can't afford a tubing bender, eh, Nick?"



NEW SOLENOIDS
Ron Thibault
2/16/92

I needed solenoids to build my Arizona and have found a new solenoid to use. The new solenoids are from Winco. This is the same company that made the solenoids Marty Hayes wrote about before. The new solenoids however are more durable. The old solenoids had teflon valve seats. These were prone to permanent damage if any foreign mater got caught between the seats. The new solenoids have a more durable plastic seat. These seats are recommended by the manufacturer over

teflon for freon use. Also these valves have only a two week shipping time as opposed to 8 weeks.

The seats are indeed more durable. I had copper slivers caught into two different valves. After disassembly to remove the material both valves still held pressure with no leaks. From all I have heard of the teflon seats they would have been ruined.

The solenoids are made by Winco Inc., 155 Terwood Rd., Willow Grove PA, 19090. The part is KIP Solenoid Valve part number 27911213 61 6VDC. Call them for the latest price. Last year at this time it was @\$29.50 each.

but the cost is still prohibitive for the labor to manufacture that type of system.

"The only other alternative is the replacement gases for R-22, but as yet, those are not commercially available, and from what I gather, the replacement gases will probably be restricted to licensed dealers by Federal Law, and at a price comparable to the future freon prices. Where freon is currently \$4/lb., the replacements would probably sell at about \$8/lb. That's too expensive.

"So, that leaves only one alternative, and that is small on-board air compressors. A good workable gun run by air compressors is something that has eluded us for some time. The guys in California have been using air compressors, and indeed, they have a very good system. The system that was described in the last issue of U.S. Boat and Ship Modeler - the high pressure pulse gas B-B guns - I was totally taken aback. The gun that I had in the Alabama back in 1980 was based on the exact same type of system. It was a high pressure pulse gas system. My gun could knock holes in ships, but the engineering was poor.

"The California group has taken this system and made it workable, and they are either using CO2 or air compressors to power it. I have seen this system first hand, as it is described in the magazine. It works quite well, but unless you're using CO2, or a compressed gas, again, an air compressor takes time to charge up this system. It's generally 2 to 3 seconds between shots. It's very slow because they have to charge these reservoirs to 100 psi to fire. It's also very pricey and complicated with the amount of parts that it operates with. Most of them are stock Clippard, but there are many that they have to modify. The price per gun, just for Clippard parts, is around \$30.
"So, Poster and I have been putting our

heads together recently, and we've been working real diligently at coming up with an air compressor fired gun that fires single shot, and does not have to recharge an air cylinder. For a while, we've been using air compressor guns in our little "Stock Class" boats, but they fire like the old Geek gun. They're not a spurt gun, but they're not singleshot either - they fire bursts of 1-4 B-Bs. You just start up the compressor and let it run, and the gun starts firing and goes "Kapow...Kapow...Kapow", not really fast, but it does fire short little bursts.

"We wanted a single shot gun, and we have put our heads together and got one that's pretty well perfected. It still does not have the rate of fire of the gas guns. It has a rate of fire of about one round per second. We can fire a fifty round magazine in about 40-45 seconds. That's not really fast, but it fits in a cruiser, it's reliable, you don't have to buy freon, it's powerful, it's not affected by temperature, it's environmentally safe, such cheaper to operate, and I think it's just better all the way around. But, due to its rate of fire, it's not likely to be competitive in the club.

"However, it is something that I am going to market through Skunkworks, and eventually I think the people in the club are going to be faced with the decision of changing away from their R-22 gas. And if they choose CO2, they're going to be limiting cruisers, because cruisers are not going to be able to carry a CO2 system. The guys in California have chosen CO2 for the most part, because like our club, they have mostly battleships. Their cruisers use compressors, but they already have limited rates of fire. In our rapid rate of fire club, the air compressors just don't stand a chance against something like CO2 or freon.

Questions Commonly Asked

Where can CO₂ be used professionally?

EVERYWHERE! The need for portable power is in evidence at every construction site, most industrial plants, farm locations, and all remote job applications.

Construction:

Even though power may be "available" on a construction site, its availability may be limited and the distance away from specific job applications considerable. Therefore, the contractor must either wait for the power or spend hours laying and picking up electrical cord. Both of these alternatives are very costly and in many cases economically impractical. As a result, he may resort to hand methods which are also very expensive. In cases where scaffolding must be erected, more cost and inconvenience is encountered with the additional time required to string, move and work with electrical cords. All in all, obtaining adequate and accessible power by the contractor is a substantial problem.

Industry:

At industrial plants, maintenance, repair and in-plant work projects create many power source problems. Often these tasks are done by hand because either the power is not available where needed or it is not practical to spend the time to "hook-up" in order to use conventional power tools.

Farm and off-road equipment

Expensive equipment in mines, on a farm, in the forests, and a multitude of vital specialty vehicles are constantly in need of field service and repair. Idle shut-down because of problems is most undesirable and costly. CO₂ helps solve these equipment breakdowns by allowing fast, efficient air tool work at the isolated breakdown locations.

Outside and remote locations

Every type of outside and remote location repair, installation, service, and maintenance always presents power problems. In these cases, power must be taken to the location. In the past, the only alternatives have been generators, compressors, or hydraulics. All of these require very expensive, cumbersome equipment that have a high degree of maintenance; plus the costly task of laying and picking up cords and/or hoses. Additionally, their use is sometimes limited due to wet conditions or cold temperatures. Once again, CO₂ provides the most practical alternative to solve these power problems.

Can CO₂ be used for personal use and recreation?

Absolutely! Use CO₂ at home, the marina, desert, beach, mountains, parking lot, garage, and everywhere else for general work and maintenance. Hobbyists and week-end race enthusiasts welcome the professional availability of power for portable pneumatic tools.

Which air tools will CO₂ operate?

Any air tool which requires intermittent operation, i.e.: impact wrenches (to 1/2" sq. drive), drills for most drilling operations and screw setting (to 3/8" capacity), jacks, lube guns, spray guns, air ratchets, blow guns, screwdrivers, nailers, staplers, tackers, caulking guns, zip-hammers, rivet tools and many other pneumatic devices.

Can I operate a spray gun for painting?

YES. CO₂ will not react with most paints such as latex, enamels, stains, and varnishes; however, adverse effects may arise with some metal coating sprays with zinc or magnesium bases. To operate a spray gun use a low pressure regulator setting. It is necessary that the spray gun employed permits air flow only when the trigger is depressed. If free flow is continual, not only will unnecessary expending of CO₂ occur, but a freezing condition may occur.

Can I fill tires with CO₂?

YES. CO₂ cylinders will allow filling tires and inflating many other useful items; rafts, air mattresses, balls, inflatable toys, river boats, etc.

Is CO₂ safe in flammable or explosive environments?

YES. Again, CO₂ can be used with safety and confidence because it is a fire retardant.

Can CO₂ be used around water?

YES. The hazards of working with electrical tools in wet areas is well known. In fact, there are numerous times when work must be stopped or hand methods used because of the dangers of electrical shock. Since CO₂ is used to power tools, they can safely be operated around, in, and even under water.

Why use CO₂?

CO₂ has tremendous expansion capabilities, entering the tank as a liquid and leaving as a gas. CO₂ generates approximately 9 cubic feet of vapor per liquid pound of CO₂. Therefore, a 20 pound capacity tank will yield about 180 cubic feet of gas. If compressed air were used, even at 200 psi from a high output compressor, that same 20 pound tank would hold only about 6 cubic feet of air.

Where are CO₂ tanks refilled?

CO₂ is perhaps the most readily available commercial gas. They can be refilled at any location that has CO₂ transfer equipment. Sources include most welding supply houses, industrial gas distributors (Airco, Chemetron, Liquid Air, Liquid Carbonic, etc.), bar and beverage distributors, bottlers (Coca-Cola, 7-Up, etc.) and companies that fill fire extinguishers. These locations will be very willing to refill tanks; servicing CO₂ is a regular part of their business.

Is CO₂ expensive?

Not at all. Considering the poor alternatives, CO₂ is a real bargain. CO₂ is relatively inexpensive and should cost only about 45-50¢ per liquid pound (\$9.00-\$10.00 for a 20 pound tank refill).

Can the CO₂ cylinder be laid on its side?

NO. The tank must be operated in the upright position, at least until it is more than half empty. Otherwise, the liquid will run into the regulator, hose and possibly the tool. However, if the valve is shut off, the tank can be stored or transported in any position.

What is my system ices up?

Icing may occur if the system is operated or extended for frequent periods of time. If this occurs, shut off the tank and allow several minutes for warm-up.

What is the internal tank pressure?

When considering CO₂, it is important that the normal fears one may have of high pressure cylinders be dispelled. CO₂ is considered a relatively low pressure industrial gas, rarely exceeding 1000 psi.

What is the regulator delivery pressure?

100 psi is pre-set at the factory. The internal tank pressure of CO₂ is far too great to run through hoses and tools. Therefore, the pressure regulator is pre-set by the use of a pressure-control spring providing a constant 100 psi line pressure. This is ideal and sufficient to operate a multitude of pneumatic equipment for most applications.

Can the line pressure be changed?

YES. Since there may be times when more or less pressure is needed to operate the desired pneumatic device, different pressure settings are available. We have provided an easy method of increasing and decreasing the line pressure. After closing the tank valve and relieving pressure from all hoses, simply remove the cap from the regulator and replace the 100 psi regulator spring with a different pre-set spring; available in 100 psi and 150 psi settings.

Do CO₂ cylinders have a tank or pressure gauge?

CO₂ maintains a constant equilibrium between the gas and liquid phases. Although internal tank pressure can vary with the surrounding temperature, tank pressure remains constant regardless of how much or little (even one drop) of liquified CO₂ is left. After all of the liquid has been expended, only seconds of operation is left. Therefore, a pressure gauge is not practical.

How is the CO₂ level determined?

Since it is the amount of liquid that really indicates the tank volume remaining, the weight of remaining CO₂ must be determined. The unused pounds of CO₂ can be measured by simply subtracting the empty (tare) weight of the cylinder from the total weight.

Can I use any CO₂ regulator?

NO. Conventional CO₂ regulators have been engineered for beverage equipment. Such applications require low pressure and small flow rates. Common pneumatic equipment requires performance levels far exceeding conventional design capabilities.

"JUST SAY NO ..
to water-proof boxes"

by Danny Schultz

Using a plastic sandwich type baggie you can place your receiver inside it (is wise to use two or three) and wrap a rubber band a few times around the open end where the leads come out (one rubber band per baggie). Place it in your boat with the factory seam on the top and the open (rubberbanded) end on bottom. This way if your boat does sink your receiver will be in a plastic bubble and will not leak unless there is a hole (which is why it is wise to use four).

For any non-believers the MARYLAND has used this system for 30 or so sorties and has sunk at least a dozen times. Only once did the receiver get wet (two baggies and some */#@ axis put a bb in one).

Remember that if you need fast access to the radio a knife can get you to it a.s.a.p. and it takes just a couple minutes to redo the the baggies.

SPECIAL NOTE: Gross Admiral Fluegel did not have a box for his radio at Nats. I offer several baggies and his reply was that the BISMARCK doesn't sink. Funny thing is that when he does scuttle her, she still "goes beneath the water" and his radio is still going to get wet. Some protection is better than none. So wrap that rascal.

Dan

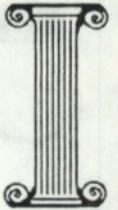
Wishful Thinking
By Boyd Poot

I wish free-on was cheap-on.

A TOOL REVIEW By Steve "FAB" Baker

Have you been looking for an affordable drill press of good quality? So was I, and I've found it! For years I used one of those jobs that you clamp a hand drill into. I got good results for what I paid for it, but I always yearned for a good quality drill press. My problem was that, number one I'm cheap as hell and I didn't have much room to work with. That pretty well ruled out a stand alone floor model on both accounts. The problem was that all of the bench size drill press that I had seen, Sears, Sante Fe tools ect were in the \$120 range and, if you extended the spindle and shook it good one time, had lots of slop in the shaft. What to do? My Dad, one of the few people on the face of Gods green earth that's cheaper than I am, provided the solution. He purchased a handy bench top drill press from Harbor Freight Tools. This is one of those tool catalogs that show up with the regularity of J.C. Whitney's so I was a little skeptical. However, after Dad had it for about a month, and was still tickled with it, I decided to take the plunge. I sent off \$69.99 (shipping is free) and about 4 weeks later received my drill press. The reason it took so long is that it was back ordered. Seems that these little jewels are made in Communist China and once they go through a shipment they have to round up some more student protestors to make a new batch and then ship them to the U.S. So if you order one and they tell you it's on back order, have faith, a pleasure postponed is a pleasure increased. When you get your drill press assembly will be required. This is no big deal. If you can't figure it out, you probably shouldn't be using one anyway! Point is, the only short coming this press has is it's chuck. It's mounted on a tapered shaft and if you don't put it together right it will fall off sometime when you're pulling a drill out of something. So, here's some advise. Before you put the press together, get some Loctite thread locking solution. Put some on the tapered shaft, retract the jaws of the chuck, obtain a small piece of 2x4 and a large hammer.

President's Column



The International R/C Warship Combat Club

Commander's Column

Well, it's finally that time of year - time to get the ships out of winter storage. The practice pond is now ringing with the sound of firing bb's as the local fleets tune up for the coming round of spring regionals. In the East, the opening round comes in Baxley, Georgia with the Southeastern Regional on April 25-26, then northward to Maryland Attack Group's Northeastern Regionals (CD is Nathan Blattau, Fluegel) on May 30,31. This is all leading up to Nationals in Orlando, Fla. at the end of July (27th thru' 31th.). I haven't heard of what activities are planned in Texas and the mid-west or in Fla. proper for the spring, but in the least they will have some practice at the pond.

For the Rookies, it is important to get out and practice with your ship, get to know the feel of the controls, find out if it turns better left or right, how far you should shoot, etc. If you have others near you, practice with them, if not even running by yourself is important to get the feel of your vessel. It's also important for non-rookies, but they should know that.

Review your rules, in the last several years I have noticed that some rules are not clear in the majority of the battler's minds. There have been times when I think that the loudest voice on the pond prevailed rather than the correct one. The rules are not just for the Contest Director to know.

Safety, remind each one of us about safety constantly. Over the years we have be extremely lucky to have maintained such a good safety record. However, there have been some close calls with safety items in the past so this is not the time to become lax.

The ice is breaking up and I hear the chief engineer complaining that we have had steam up for some time for no good reason so I guess I'll get going. Fair weather, smooth sailing, and hot bb's.

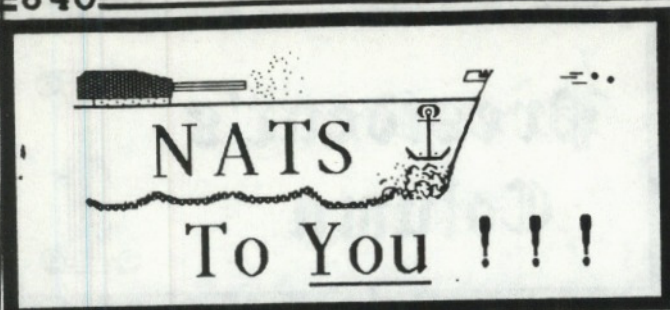
Marty Hayes
Capt. of the HMS Warspite.

Place the chuck on the shaft, the piece of 2x4 on the chuck to protect it and give it a firm whack with the hammer to seat it in place. Now put your press together and enjoy the ability to drill straight perpendicular hole!!!

Specs: 5 Speeds 620-3100 rpm
8 1/4" max distance spindle to table.
1/2 chuck.
2" stroke
22 1/2" high
47 lbs.
Catalog # 420
Item 05901-2cnf

Available from Harbor Freight Tools at 1-800-423-2567. You won't regret it!!

Another tool that goes along with this one very nicely is an Adjustable Wheel and Circle Cutter. It's available from Sears for just under \$20.00. It's very useful for cutting very accurate holes in decks to locate barbetts in. It also cuts nice round wheels that can be used in circular cross section items for superstructure. Don't try to use this thing with a hand held drill! It won't work safely. Happy drilling!!!



Well, the ice is almost off the water up here in Chi town -- and that's when a young (or old) person's fancy turns to battling and bbs whizzing through the air. Most of the new ships that will be launched in 1992 are probably already on the water. We will most likely see a slew of new 24 second capital ships on the water this year.

In the next issue of HULLBUSTERS I will provide a simple (for Axis) map of the Orlando area showing the battling pond, the motel and the major freeways in the vicinity. Other tourist attractions will not be located since you can find out all that info when you get to Mickey Mouse Land. As of March 20 I have processed about 40 memberships for 1992 -- about average for the past few years. The Texans haven't signed up yet; they always wait until after their NON-SANCTIONED Triple Crown meet in the spring to send in their \$\$.

Insure that you have performed the following checks on your ship(s) prior to coming to 1992 Nats:

- A. Check the weight
- B. Measure the overall length and beam
- C. Count the number of ribs
- D. Check the rudder area
- E. Drop test the hull if in doubt
- F. Check your actual waterline in the water
- G. Check your speed

These checks (and any corrective action) will insure that you can get to bed before 0300 hours on Monday morning. I will bring a scale and a tape measure and a copy of the Ship List to Nats -- all ships will be checked for physical and construction characteristics on Sunday.

The format of Nats in 1992 will be the usual one -- unless the battlers indicate to me otherwise. The tentative daily schedule will be as follows:

MONDAY	Fleet Battles
TUESDAY	Fleet & Campaign
WEDNESDAY	Small Ships & Individual
THURSDAY	Fleet & Campaign
FRIDAY	Fleet
FRIDAY	Evening: Banquet & Rules Mtg

See you all at Orlando in July!!

Tom Jass

Advanced Gun Design by Vern Dernberger

April 1, 1992 - After three years of top secret research and development, a document obtained from the Axis Office of Advanced Weapons has confirmed the existence of a revolutionary BB gun. The Magneto Gun, as it is commonly called, has no mechanical pistons or pneumatic parts, relying solely on two simple magnetic coils and a single stainless steel tube. One of the coils is used to isolate a single BB which is then accelerated by the second coil, reaching a speed of 100 ft/sec at the end of the gun barrel.

Laboratory tests have shown that the gun is capable of penetrating 1/8 inch plywood at a distance of up to 12 inches. Because of its simple design, the gun is completely maintenance free and can not be damaged by BBs or water. Furthermore, the coils are so efficient that only a standard 9-volt transistor battery is needed to power them for an entire year.

An Axis official, who wishes to remain anonymous, stated that "the Magneto Gun is a

quantum leap beyond anything currently being used in R/C warship combat ... a few Lutzow's equiped with these guns could obliterate an entire Allied fleet in less than 5 minutes."

Although no official word has been released, weapons experts believe that the Magneto Guns could be deployed experimentally on a small number of Axis ships as early as the Spring SE Regional. Assuming that such tests prove successful, a full scale deployment of the revolutionary guns throughout the entire Axis fleet could be completed sometime in 1993. "If the guns work as well in battle as initial tests have indicated", said one independent expert, "we will probably see a large number of retirements from the Allied fleet."

When asked if the Allied fleet had any of their own plans for advanced weapons, one captain stated that "all of our efforts have been concentrated on proposing new rules ... we hadn't really considered the benefits that might be gained from the development of effective guns." When Axis Gross Admiral Fluegel was asked about the Magneto Gun, he stated that he could "neither confirm nor deny the existence of such a weapon", but the smile on his face and the twinkle in his eyes said otherwise.

OBSERVATIONS OF A ROOKIE

By Mich Henshaw 11/91

There I was, totally innocent. Happy with my life of crashing airplanes and ramming my 4WD buggy into the race wall. Little did I know that I was about to embark on the greatest test of will since attending Air Force survival school.

I saw it on the board at work. A notice inviting folks to come and see a precision

steering contest, you know, with those cute little model boats. Being open-minded and currently bored to tears, I gathered myself up and took a peek at all the action on the pond. To my surprise, besides the nice scale hospital ships and tugboats, there were a number of heavily armed major and minor combatants. "What's this?" I said "These guys must be nuts!" Can you imagine? Spending all that time to create a nice ship and then letting some other bonehead send it to the bottom.

"I must check into this further" was all I could think. We all know the progression from there. Mild interest eventually turns into a crazed battle frenzy. The mind totally taken over by the lust to build the ultimate killing machine.

I was no exception to this condition and promptly set out looking for an appropriate platform. I had already thought about building for the German fleet, but honestly, I look terrible in Swastikas. As for the Japanese, all I remember from history class were all those pictures of Japanese ships settling to the bottom like so much lead. The Neutrals had nothing particularly interesting, and the Allies, well, you know, "Ugly, slow, and casement guns". What was I to do?

It came to me as I flipped through "Jane's All The Worlds Ships 1942". It was relatively small for a BB, only 600 feet of so. I was captured immediately by it's unusual looks and uniqueness. Her name you ask? Why, the OCTOBER REVOLUTION. Formerly the Petropavlosk. Back in the days before the CZAR took a long walk off a short pier.

The initial reactions I received at the club consisted of alot of grumbling and moaning. "Russian?" they said "Too slow" they said. "It sure doesn't have much firepower". This continued for some time. Right up until the rule changes came out for 1991. Things changed right away. "Wow! It's as small as a cruiser with the firepower of a BB!"

Having been suddenly re-evaluated for my choice of vessel, I set out to build the beastie. I had quite a time finding plans for it, but the kindly John French took me under his wing dug through his contacts. Within a short time a rolled up carton arrived and I was on my way. Having built (and crashed) a few planes in my day, I was familiar with just how abstract a set of plans could be. Everyone said that these were very good plans. The look on my face gave away the fact that I didn't understand what I was looking at. At all.

The nightmare had begun. The Naval Architect who designed this vessel had an amazing sense of humor. More correctly, this was a very sick individual. Not to be beaten by simple pen strokes on paper, I began building at a feverish pace. At least until I came upon the dreaded twists and bends of the architects plans. This guy had a ruler that looked like a french curve. Not one line is straight. Well, almost none. The turrets you see, are your basic box and about as big as they come. Rumor has it that the crew used to play the communist form of baseball on the turret tops. That's where the batter hits the ball and the entire team runs around the bases collectively.

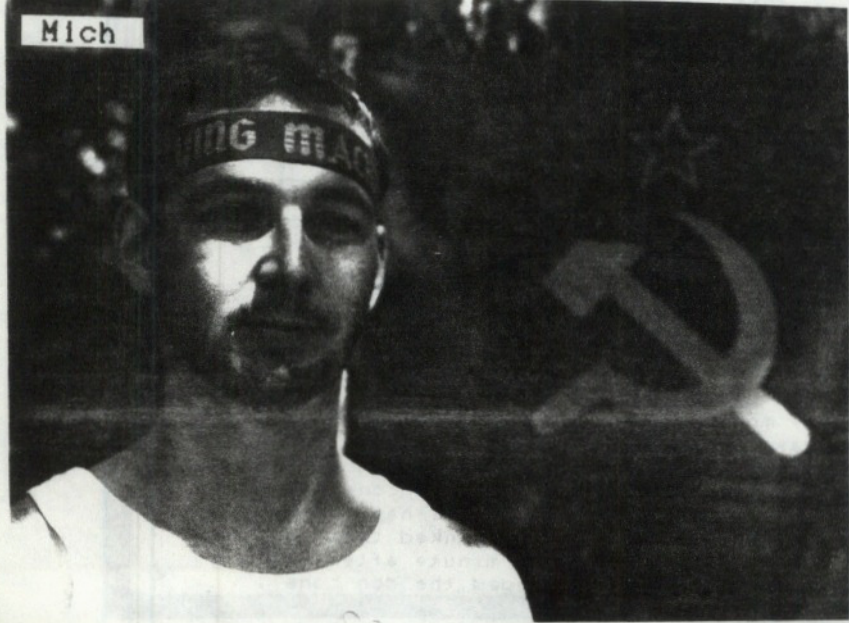
After much sweat and many dollars I had a fleshed out hull and superstructure. Now it was time to get it motivated. "What do you mean \$75.00 for a motor?" I asked "No way, not me". I promptly marched my butt down to the "Technology Store" and bought myself some nice \$3.00 DC motors. Next, I acquired a battery, a pump, guns andand ... God! Does it ever end?

She was finished for the Spring Regionals. I took her out for her maiden voyage a week or two prior to the event to see how everything worked. There it was, gleaming white, with a bright red star on the forward turret. I pushed on the throttle...it began to leap (read that as crawl) across the waves. The throttle worked great (except for that reverse thing). After a nice 10 minute cruise she began to settle nicely into a groove (she was leaking), the handling was incredible (180 degrees in 5 minutes flat). I brought her in and dumped what must have been a little bit of dew out of the hull (3.5 gallons). That big hole in the side where my thumb went through was obviously a defect in the balsa.

I was pleased. I continued on to compete in the Spring regionals where I performed flawlessly (I sank 3 times). See I knew this would be easy.

Please single space.

Mich



Opinion By Danny Schultz

At NATS 88 I went one on one with Fluegel and He agreed to try a little exsperment. I slap some plate material on my starboard bow (plate material is aluminum sheet aproxmently .005 in thick). Well in that sortie the MARYLAND went out of control and beached itself. Fluegel sat on the port side fighting the current to get a shot at me. When my 5 min. was up we pull her out of the water There was in fact "1" hit on the starboard bow. One nice round hole, the same size as a BB. There mas no dents in that area either.

So lets ask a few question on this stuff.
1. What does this mean ?

There is other material that can be used.

2. Can you cheat with it?

Not really I'VE found out that Dope will give the hull a superb paint job or you could use

842
spray paint and that would be all that's really needed. To make sure nobody could let's say "CHEAT" (using thicker material) we could throw a mike on it and check the thickness.

3. What about patching ?

Dope (or ambroed) & silkspan do a great job on patching holes it's considerably weaker there, but the hole is patched.

4. How do you glue this stuff ?

Are super glue will hold the plate BUT, if you would take a hit near a joint or even between two the glue seam will pop (ever see a ship peel its skin) When I battled Fluegel I used silicone. It worked, probably silicone would be the best apacation I never tried something else. However it takes about 12 hrs to dry.

5. Suppose somebody RAMS your boat ?

Minor rams could just about go unchecked (not to say you could) because plates have alot more strength at large impact areas than the balsa "side swiping" would be one example. If some moron plows into your side with a pointed bow rest assure you got a hole if he would infact do a good job he could either get stuck in your boat and hold you up or, sink with you. Balsa, silkspan & ambriod would be the best for emergency patch like this.

6. Is it easy to work with ?

Yes. Better than balsa. It will curve around your hull alot better than balsa. It won't split, crack, warp, or even rot. You can cut it with your axcto knife. I get in sheets 2x3 ft. Thats big enough for me to skin the MARYLAND with two sheets with alot of scrap.

7. How much do plates cost per sheet ?

I got my for free. You could go to almost any printing company and pick them up for a fraction of the price of balsa.

8. Is it safer ?

I would have to be honest and say "NO". You would have to tweek you guns to max to penetrate the plate at a range of more than 10 feet. 15 feet would be the max you could hit and enter this stuff. WE use this stuff around here for testing guns. The sound it makes is alot diferant than balsa.

9. Would this add any realistic to the hobby ?

Yes, the ships would in fact look better because they have one or two seams on the

hull. A very smooth finish with NO SANDING needed. I build my superstructural out of balsa and then plate it. BB's hit bounce off and leave a dent. This is also how one can determine if the other side has high elivated guns. At the end of a weekend/week/year/or when its been shot up enough, peel it off and replace, paint and your good as new. When doing superstruction I would recommend "HOT STUFF" because it would peel off better.

10. Do I think that it would be accepted in the hobby over the next couple of years ? NO. There is alot people who would feel that question 8 would make there mind up real fast. BUT, remeber what is everybody out there doing right before battle ? They really aren't helping the hobbys safety standards by tweeking there guns down. And its those guys who really fear about plates. They know how to make there hull tuff. There the ones who gets the biggest kick out of seeing some poor sod's boat get blow away by there super guns hitting and penetrating every time. It would be also alot more diffulct to get insurance its one thing to say that your shotting at balsa wood and a whole new ball game with plates.

I'm not in any way saying that this is the way I want the hobby to go. I would not object to this idea. I feel that everybody has a opinion, everybody has their say, and everybody has a right to be heard. With alot of testing and research using this as a start we could change alot of things in the hobby (no pumps, bulkheads inside the boat, smaller magazines, maybe more guns) This all depends how many of us are willing. It could eventgully be a so realistic that nobody could say that are boats aren't like the real thing.

Just let your imagination run wild and see what you can think up.

USS MARYLAND BB 46

if all else fails kick a AXIS ship
(nothing feels than better)

X

" INSTALL DU-MEES "

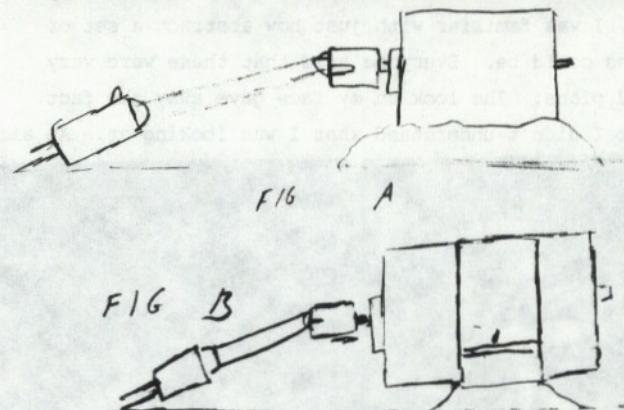
by Danny Schultz

Everybody has a differant way of installing Dumas 12 volt motors. Mine is quite primitive but very effective. I have use two types.

The first type is simple. I mark where my motors are to go. I take some standard everyday RTV and lay down a nice blob approxitly where the motor is to rest. Then I place the engine into the silocone and the dog bone into both the motor and shaft. You have some time to adjust your motors and then let it dry (fig a.).

This has proven very effective in the MARYLAND. However, there are a couple of draw backs. RTV takes a day to cure. So if you would have to replace a motor at lake side you could be in trouble. Slow and Zap will work but it will not always withstand the tork. Also the older the RTV gets the weaker it becomes so once a year I recomend replacing the RTV. You can't be sloppy either unless you like removing RTV.

The second method is very similiar to my first. The only differance is that this way lake side replacement is pratical (why I don't know, 12 volt dumas aren't suppose to fail). Mark where your Due-meets are to be placed. You get a harness with each engine,



mount it securely to the engine with the little cradle on the bottom. Then put your dog bone in and silicone down the cradle on those marks (fig b.)

I stress the point of mounting motors with the dog bones at the same time. I always run my motors before the silocone sets up. This way I can make any adjust needed. DO NOT turn your motors on unless you are either holding them down or the silocone has fully cured. (I will admit that I have on more than one occastion I haved cranked them up (full throttle) not even a minute after putting one in and had it winged the dog bone).

X

CO2 UPDATE by Steve Smith 1 20 91

The Winter 1991 U.S. BOAT & SHIP MODELER had an article on an R/C Combat CO2 system by John C. White of the South Coast Battle Group. Most of my information on CO2 for ship use has come from John and after reading it, you'll know as much as I. He has found a regulator small enough to fit in a ship (about 1.50" dia X 2.50" long w/o nut). I purchased one through John for \$39 so CO2 is still not cheap. With a tank and miscellaneous fittings a CO2 system would run \$60-\$75.

I plan on using the stock tank valve and high pressure flex hose instead of running copper tubing from the tank to the regulator as shown in the article. I think it would be safer and the tank could be switched and refilled outside the ship. Also, it would be a good idea to protect the tank from stray BB's.

John says he has a torpedo system just about done. He also carries a line of 1/144 ship plans (scaled Wiswesser). For more info:

John C. White
12621 Cleardale #1
STANION CA
90680

(714) 893-7371

The regulator is from:

Williams Products Inc.
1279-E West Stowell Road
SANTA MARIA CA
93454

1-800-592-5925 in California
1-800-235-4112 National
805-349-7209 FAX

CO2 REGULATORS.

LEFT TO RIGHT

BEVERAGE REGULATOR

50 PSI MAX \$28.00

(FOR SALE - GOOD FOR BEER
OR FOR SODA EQUIPMENT)

WILLIAM'S PRODUCTS

REGULATOR (AS SEEN IN
U.S. SHIP & BOAT MODELOR)

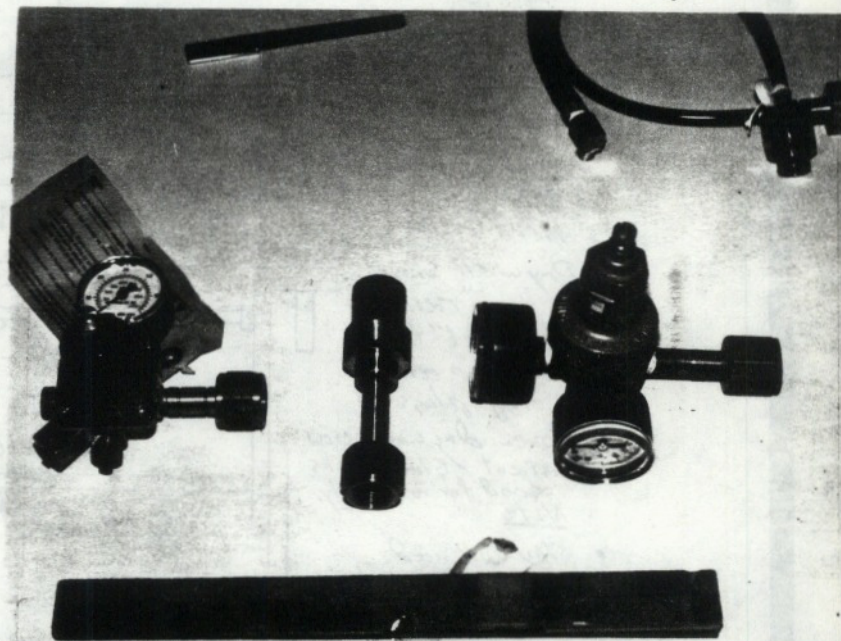
\$39 100 PSI

NURGEN REGULATOR

ADJUSTABLE TO 150 PSI

\$25.00 W/O GAUGES

HAPPY BIRTHDAY TO MARYCEL



LONE STAR



Task Force

Having long suspected that in addition to their many despicable traits, the Axis couldn't count, we Texans read with great satisfaction the announcement of the "Tri-Pact Team Trophy". This account not only revealed the apparent lack of mathematical skills among the members of the "Tri-Pact", but also their apparent lack of battling skills.

Yes, that's right. It seems that the "Tri-Pact" members

are so devoid of skill, much less arithmetic, that they feel they need a fourth member, Will Montgomery, in order to be competitive. That they've lacked something besides morals has often been apparent, but in choosing to obtain the services of a battler as renowned as Will they admit to their mediocrity as battlers. One has to wonder what duress they had to apply to persuade a battler of such esteem and honor as Will to join them in their dark plans.

We who read this account were justly incensed by this affront to dignity and digits, and it was decided that response in force was necessary. Fairness being a part of our nature, we have graciously invited the service of Admiral Haynes, to whom Bushido is a way of life. Admiral Haynes has agreed to participate in our sortie, so that he may defend the honor of his fleet, lest it be besmirched by these foul Huns.

We, the members of the Lone Star Task Force would therefore deign to issue a challenge to these rats who call themselves a "Pact". While we enjoy the prospect of destroying this enemy at our leisure, we are yet merciful and willing to accept a written and unconditional surrender. However, if their writing skills are like their math skills, we

need not expect this to happen.

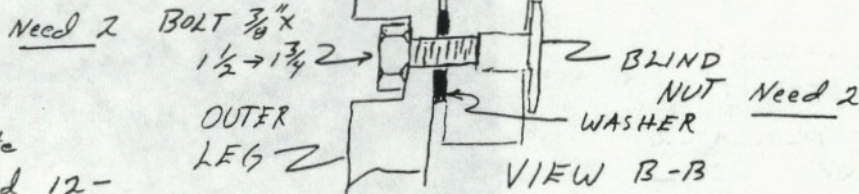
Let it be known that on Wednesday, the 29th of July, our fleet will sail into the Straits of Orlando, there to do battle with the foe. Let the "Tri-Pact" oppose us, if they dare. We look forward to giving them a thorough lesson in humility, as well as mathematics.

Regards,
 Brian Craven David Haynes
 Jim Pate Chris Pearce

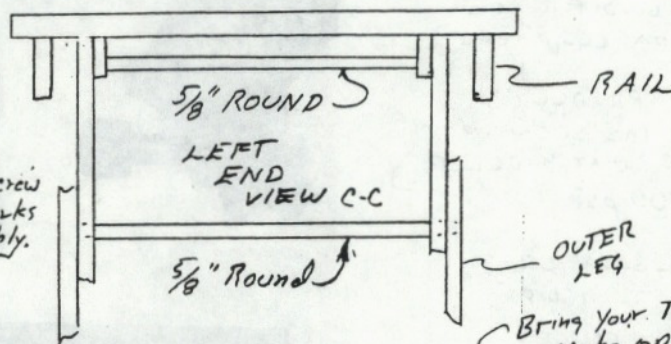
FIELD TABLE
 By George Goff

If you have ever had trouble getting all your equipment in your car plus a table to work off of at the Battle site, this may be for you. E.J. Drown, a show boater in Orlando, FL, came up with this collapsible field table. He passed out copies of the plans for it at the lake site that we use and showed his off. I have built one and it seen to work well. I am planing to build a collapsible stool that will fit inside of it to use at the nats. You can build one for under \$20. I hope this helps some of you who like me have limited car space.

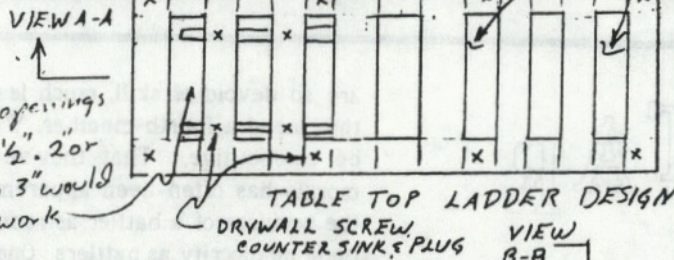
By E.J. Drown
 407-269-1285
 2/14/92



- Note
- Need 12- Drywall screw to join rails and lock to table top and 12- 3/8" plugs to cover drywall screw
 - Instant Glue works good for assembly.
- Note
- You will need either ply wood or enough 3/4" wood to make top with or without openings shown



Bring your Transmitter. Make opening this end sized to hold Transmitter

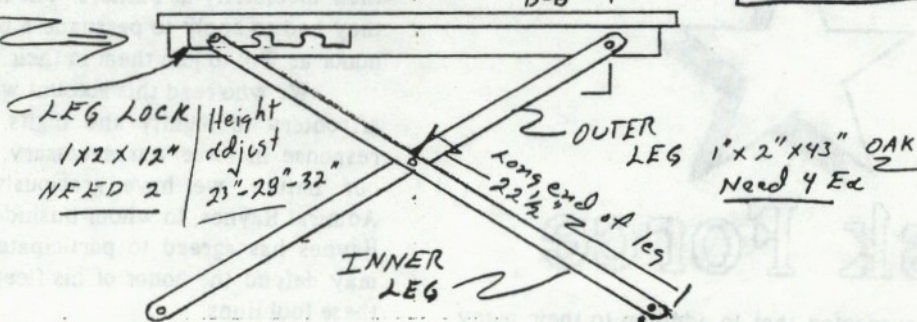


My openings are 1 1/2" - 2" or up to 3" would work

TABLE TOP 3' x 21" x 40" (MY SIZE)
 USE PLYWOOD (1/2")
 OR MAKE LADDER

I WILL SUPPLY BASKET JOINER FOR LADDER TYPE.

LEFT END VIEW C-C



NOTE

- you may want to make table top slightly different size - so that it will fit your trunk. However suggest 21" min width - For stability.

VIEW A-A

5/8" ROUND TYP. 4 PL, NEED 4 PIECES 16" LG.

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FOR SALE

The people at the
the supply houses say
they wouldn't worry about
the use the way we do
it

Article provided by Dirty

What do the 1990 Clean Air Act Amendments on CFC emissions mean for air conditioning and refrigeration technicians?

A seminar conducted at the Refrigeration Service Engineers Society convention, a group of industry experts answered this question and discussed the proper methods for recovering, recycling, and recharging refrigerant.

Effective July 1, 1992, intentional venting of refrigerant is illegal. This means that all personnel must, by law, attempt to recover (contain) refrigerant when servicing a system, said John Ottinger from the U.S. Environmental Protection Agency. Potential legal ramifications will include fines and even imprisonment. By 1996, even inadvertent refrigerant releases occurring during "good faith" recovery efforts will be considered a violation.

To complement the provisions of the Clean Air Act Amendments, the U.S. EPA is developing specific regulations related to manufacturing, capture, recycling, and disposal. The first batch of regulations, which were originally

the disposal point may include a requirement that technicians pass an approved certification in order to work with refrigerant or even purchase it, she said. Performance standards for recovery/recycling units probably will be developed, she added.

It is critical for service personnel to understand the requirements for capturing and recovering refrigerant, stressed The Engineering Co.'s Victoria. Refrigerant must, at the least, be recovered from the system and contained. After that, there are several options: it can

Outlog 92

be recharged back into the system it came from; it can be recovered (cleaned) on-site with some type of machine, again for use back into the same system; or it can be sent in DOT-approved containers to an off-site reclaiming facility, where it will be analyzed, and certified to meet specifications for recharging refrigerant.

at another site. "Refrigerant moved from the jobsite must be reclaimed," said Omega Recovery's James Herbert. As for some of the recycling machines on the market, there is a lot of determining precisely what is in second-hand refrigerant before it is reclaimed — often via chemical analysis — to make sure it meets ARI standards for recharging refrigerant.

Kamm said contractor servicemen need to change their approach to the refrigerant they work with — it belongs to the homeowner.

Outlog 92

the building owner. This means that when refrigerant is recovered in order to perform service and repair, that same refrigerant should be put back into the system. If the serviceman cleans

ery and recycling," she said. Refrigerant from a compressor burnout doesn't necessarily have to be sent off-site for reclaiming; some burnouts are worse than others, said Kamm. "It's up to [the technician] to decide whether you clean it up yourself by the method and put it back in, or if it's off" to be reclaimed.

But under no circumstances should refrigerant be taken out of the customer's system and put into another, even if a recovery machine is used. There is no way to certify the purity level, a contractor, or even the original refrigerant owner, could be liable. Kamm believes that regulations are a good way to get rid of contractors who vent and charge customers for new refrigerant.

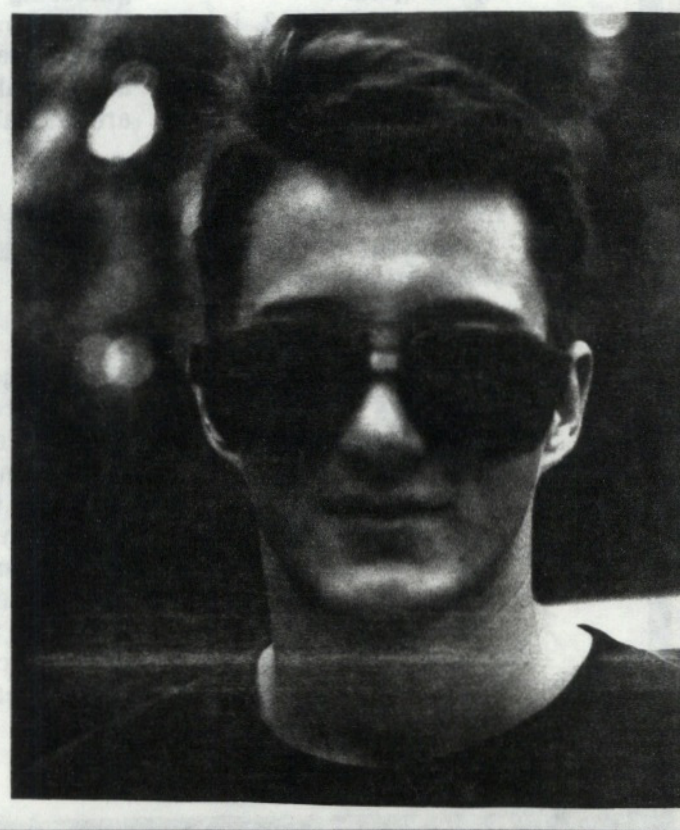
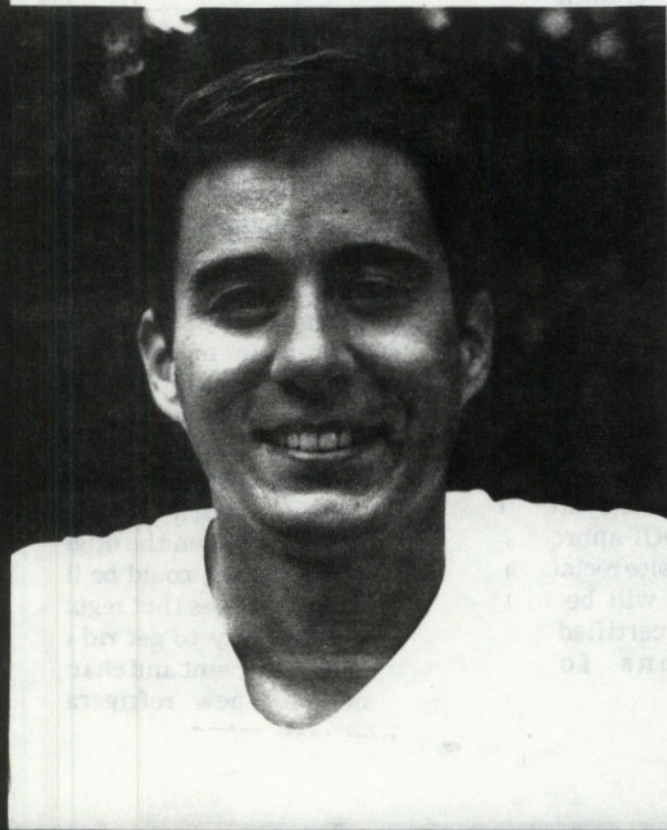
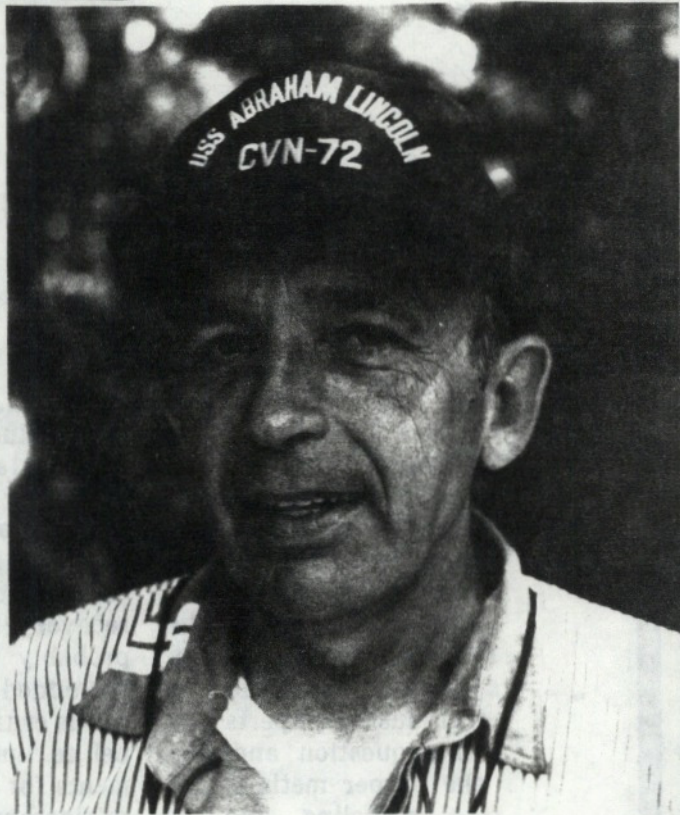
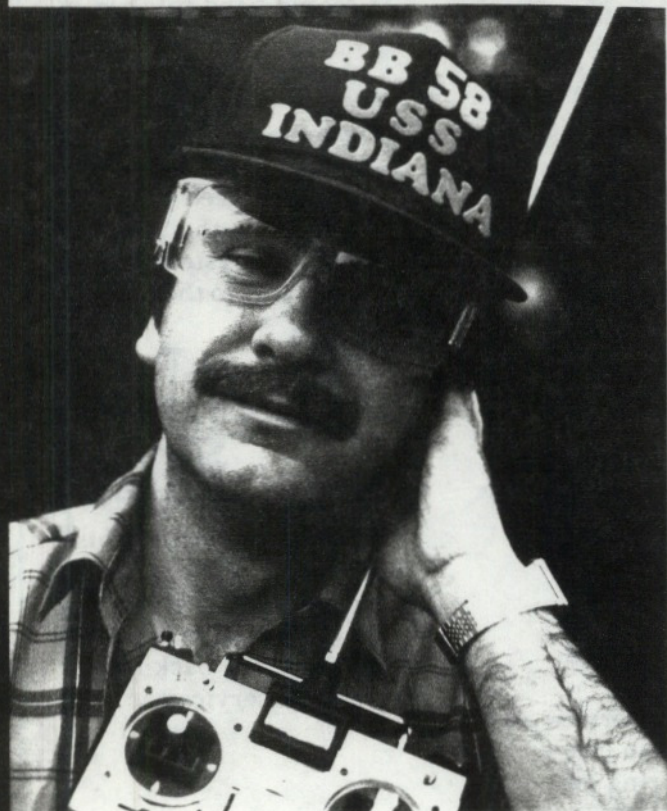
look

she said.

at what's in my sys
mine and it's what I paid fo

NAME TAGS, by Fluegel

Sometimes its hard to tell people apart. Here we have to set of twins! Top, Jim and Tom. Bottom Nathan, and Mike. I hope our hosts give us name tags.



OFFICIAL NOTICE TO MARINERS

Minister of Propaganda Maryland Attack Group

As part of its continuing effort to dominate the R/C combat world the Maryland Attack Group (the Largest R/C Warship Combat Club IN THE WORLD) henceforth considers all bodies of water between the Mason-Dixon Line and the Northern Border of Florida as part of their territorial waters. Historically, these waters were granted to the original founders of the State of Maryland and remain the property of its citizens. From this day forward, ANY R/C warship that trespasses on the territorial waters of the Maryland Attack Group will be subject to attack.

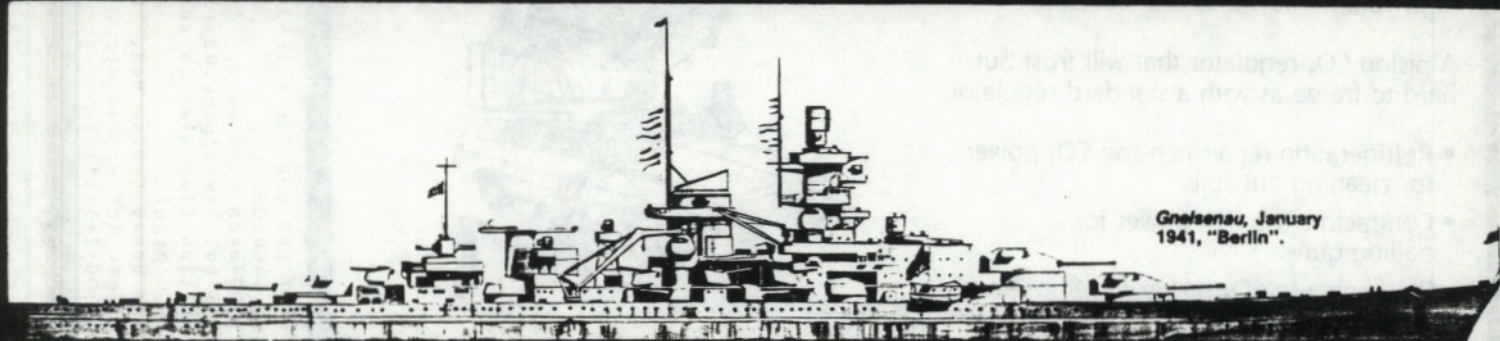
It has recently been learned that a number of foreign (ie. non-Maryland) captains plan to meet in Baxley, Georgia on 25-26 April 1992. Since Georgia clearly falls within the territorial waters of the Maryland Attack Group EVERY EFFORT WILL BE MADE TO PUNISH CAPTAINS WHO DON'T OBTAIN PROPER PERMISSIONS. Accordingly, the Maryland Attack Group will send an Expeditionary Force to Baxley during that time period to participate in 'Routine Readiness Exercises'. The Expeditionary Force is not being sent for offensive military purposes. However, if any ship breaches the sovereignty of the MAG territorial waters or

fires upon a MAG ship, then the Force as the authority to return fire with 'extreme prejudice'. The Expeditionary Force consists of the following captains and ships:

Andrews, Steve	- California
Blattau, Mike	- Lutzow
Blattau, Nathan	- Derrflinger
Broring, Paul	- Tiger
Hayes, Marty	- Warspite
Kantor, Jim	- Warspite
Montgomery, Will	- Nagato
Pittelli, Frank	- Roma
Rogowski, Francis	- Gangut
Schultz, Danny	- Maryland

With over 50 years of battling experience, such a force is clearly invincible and will be able to deal with any and all opponents. Bewarned, the Maryland Attack Group will defend its waters against all foes, BOTH ALLIED AND AXIS ALIKE.

Captains who wish to operate peacefully within the territorial waters of the Maryland Attack Group (which includes Baxley Georgia) should contact the Maryland Attack Group immediately to obtain written permission, pursuant to a check of said captain's background and inspection of his ships. The requesting captain must also sign a statement affirming that MARYLAND CAPTAINS ARE THE BEST IN THE WORLD. Captains who do not obtain written permission to operate in said waters are solely responsible for their ship's ultimate destruction.



BEGIN TRANSMISSION
FROM: LT. COMMANDER DKM GRAF SPEE
COMMANDER NORCAN BATTLE SQUADRON
COMMANDER AXIS FORCES
NORCAN BATTLE SQUADRON
TO: HULL BUSTERS: GENERAL COMMNET
DATE: 1 FEBRUARY 92 2100 ZULU
SUBJECT: GENERAL NEWS

NEWS FROM THE NORTH BY: BRAD K. BROWNE

NORCAN has a pond site! We have managed to acquire the use of a pond about 30 minutes out of town. In another little flash, we have seven members, and we're still growing. Matt Whiteley recieved an Indianapolis from Buddy down in Florida the other day, and there is some really bad news, the veteran ship got the bad end of the mail system. She was apparently a total write-off. We were all very disappointed, since we had been hoping to get a good look at the way y'all build your ships.

My Graf Spee is ready for the water, and lacks only her gun system and batteries to hit the lake. In the meantime, I have decided to build a Victory ship, so we'd have another ship to use, even if just to get sunk, and in a pinch, we could put a gun on her and use her to make local battling more interesting.

Two days ago we had a general meeting of NORCAN, and we have our first club officers. I am President, Matt is Veep, Ron is purser, and any other sundry duties will be done by those present. We made a number of decisions, and among these is to follow the speed rules of the West Coast Combat Club. Before you get all hyped up over that, I will explain the statement.

The other night, we had a little get together as a club, and we watched a couple of videos that Matt picked up of you guys battling. I have to admit, I was wondering before I watched the videos, but now, after seeing

battleships throwing up roostertails, and ships rocking in excess of 20 degrees each way, I feel that my fears are justified. In any and all pictures of warships in WWII and WWI, I have never seen a battleship that threw a roostertail, nor have I heard of any ship (except PT Boats), in calm seas rocking back and forth at angles so large. I believe that our ships run too fast. As an example, in 1/144 scale, my Graf Spee should travel 20 ft per minute. By IRCWCC rules, my Graf Spee can travel 272',8.75" per minute. This is about 13 times the actual scale speed. One evening Ron (one of our members) was talking to me, and over the phone we figured this out. The two of us had thought that the speeds were a little high, but we had been willing to go with them. For your interest, my Graf Spee will be able to travel at 8 kilometers per hour (5mph), and that would translate to 1150 km/h, or about 720 miles per hour for the actual ship. For those of you who may not have noticed, this is faster than the speed of sound!!!!!! I noticed a proposal for a rule change that involved cutting two seconds off of all ships' speeds. This would slow my Graf to just under the speed of sound, at 1063 km/h (660 mph). I was disappointed to see that this rule was not voted in. I say this because in the club's Constitution article A number 2 states that one of the purposes of the club is to have "Semi-scale naval warship combat". I find in my own mind that when we allow only a 2% allowance for scale in the lengths of the ships, (Bylaw 2 B 1), speeds 1300% greater than actual scale speeds seem to me to be a slight discrepancy. I realize that many of you will be perhaps annoyed at me for proposing this, but perhaps we should think about slowing our battlewagons down, and leaving the races to the speed boats.

The West Coast Combat club's speed rules allow for speeds about half of what is allowed by east coast rules. My Graf Spee will run at about 40 seconds per 100'. The speeds are given by the actual speed of the ship, not by the length or class of the ship.

In closing, I realize that some of you are going to get indignant or mad at me for quiting from the constitution, and then breaking the rules by changing my speed. I will note though, that my ship does not break any rule, I can drive the ship as slow as I want. Please excuse my

arrogance in this matter, but I really believe in this and it's a free country.

If I have touched anyone's nerves on this issue, feel free to complain to me, I am willing to listen to your arguments, as you have read mine. My phone number is (613) 225-3689, and my address is 1000 Stormont St., Ottawa, Ontario, Canada, K2C-0M9.

Isalah 40:31

Lt. Cmdr Brad Browne
DKM Graf Spee

END TRANSMISSION
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DISTRIBUTION: HOTEL BRAVO
CLASSIFICATION: EYES-ANY
DISTRIBUTION NET: NON-SECURE COURIER: CANADA
POST
AUTHENTICATION: BRAVO KILO BRAVO

X

CHANGE OF ADDRESS:

Steven J. Smith
1321 Prairie Street
CHASKA MN
55318-2417

(612) 448-6342

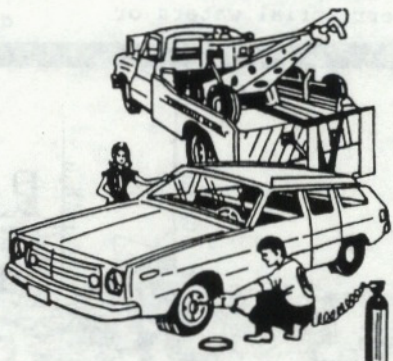
WANTED:

Modeling information on German WWII tanker/supply ship NORDMARK (possibly a sister-ship of ALTMARK?)

Portable Power with Carbon Dioxide

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we have the CO₂ regulator that works...
high volume flow and non-freezing.

A piston CO₂ regulator that will frost but
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- Independent of outside energy sources.

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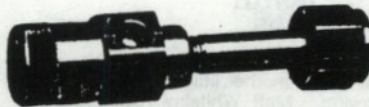
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FOR SALE

FOR SALE: (1) V6 U.S.S NAUTILUS sub.for sale with 4ch. radio. Ready and running. \$400.00...(2) Dumas 6 volt motors \$20.00/each used once. FULL COLOR SIGNAL FLAGS, 3 full sets/page. US flag, German flag, and Great Britian flag also in set. ALL 1/144 th. scale! \$3.00/page!
(1) U.S.S. Brooklyn class Heavy Cruise, Mod. hull includes 2 magic motors, gear drive, guns etc... Complete but radio! \$250.00!!!!!!!

FOR SALE

X

Elect Our Fleet Admiral

By Chris Pearce

The Six-Pack Team Trophy By Clem and Bubba

Yew know, Me and Bubba was sittin' on the front porch last week, and I sez to Bubba, "Bubba, we's just not winning as much trophies as we used to."

"We's not? I thought that's why we done joined the Axis in the first place."

"Yeah, but they's losers; they's not pullin' our weight."

"Oh, What we gonna do?"

"Well, I was figgerin' that if we's not good enough to wins us a trophy, why don't we makes us one."

"Yeah, that's plumb good thinkin', Clem. What we gonna call it?"

"Well, yew know, Bubba, I was thinkin' that since we's a team, we could call it the 'Clem and Bubba' trophy, since we's gonna win it"

"Okay, but how's we gonna win it? Cheat?"

"Naw, we tried that last time... How's about we get Cliffton Itch on our team - he's a dadburn ringer."

"Then it can't be Clem and Bubba's trophy, can it?"

"Naw, I guess not. What sounds good to you?"

"Yew know, Clem, a six-pack sounds really good to me rat now."

"That's it! We'll Call it the six-pack team trophy."

"But there's only three of us."

"Yeah, so what's the difference."

"I dunno, two?"

An' so, we got ourself this dad blame honey of a trophy, even got our names stenciled in already. Bubba had to shoo the chickens off the table so we kin have a place to put it. And if yew want to, yew can compete with us'n here for it. All's yew have to do is send us a hunnerd dollers an' a six-pack, and if we likes yew, we'uns will give yew a chance to battle us.

Don't matter though, if yew win, we're still gonna keep the trophy, "Ain't that right, Bubba?"

Dern tootin' Clem, after all, it's got our name on it."

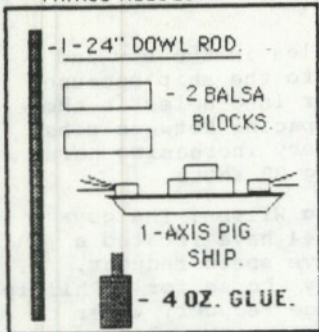
HULL BUSTERS SUBSCRIPTION

\$6 FOR 1992. SHOULD YOU DESIRE TO SUBSCRIBE LATER IN THE YEAR YOU WILL STILL RECEIVE THE PAST 1992 ISSUES. MAIL TO FLUEGEL.

DEDICATED TO 1991 CROSS ADMIRAL FRANK

THE AXIS ' I'LL NEVER TIP OVER IN NIGHT BATTLE ' OUTRIGGER.

THINGS NEEDED.



1. Take dowel rod and cut into four 6" pieces.
2. Drill two holes into each balsa block.
3. Apply ample amount of glue, screws, or lag bolts, to secure dowel rod to balsa.
4. Take finished product and jam it into the side of your ship.
5. Once again apply glue.

This should help prevent another embarasing moment for our axis comrades, who without, our clean and wholesome lives would have no meaning.

By Steve Andrews

Capt. HMS. Marlboro.

OFFICIAL RULE PROPOSALS

By Chris Pearce, Gerald Roberts, Jim Pate, Buddy Friend, etc. etc...

Propose that: Battlecruisers over 770 feet in length be counted as battleships when distributing units, but only be allowed one pump.

This would affect the following ships:

- Hood: 6.5 units
- Scharnhorst: 5.5 units
- Alaska: 5.5 units
- Renown: 5.0 units

(Courageous and Furious remain the same at 4.0 units)

This would allow these ships, which are "turkeys" currently, a little more gun power, while limiting their defensive units as battlecruisers, and would make them a little more "bulldable" for our club. I'd like to see these ships on the water, wouldn't you???

THOUGHT

by Danny Schultz

The Exective Board adapt both a computer type (IBM, APPLE, COMMANDORE, etc.) and program system (LOTAS, APPLEWORKS, etc.) that all club information is kept on.

As are hobby progress to the point that alot of people have computers. Not all the same but still a PC. I personally think it is a waste of time to have a new person type everything into his PC just so he can work it. I only state this because typo's are a big problem and this is one way to help fight it. Plus in the future we could send out floppy's instead of the rule books we recieve now.

This would scrachth some people from being a officer but remember friends, the library, maybe work would have a PC available.

If you all don't agree this year... Well there's always next year.

CMDR

- USS MARYLAND BB 46 (launched Nov '84)
- USS IOWA BB 61 (purchased fall '89)
- TBSS GRANITE FD1 (laid down summer '87)

END

NATS INTRY FORM. (page 832)

CAPTAIN'S NAME: _____

ADDRESS: _____

TELEPHONE NUMBER: _____

SHIPS NAME: _____

SHIPS LENGTH: _____

NUMBER OF RIBS: _____ RIB WIDTH: _____ RIB SPACING: _____

SHIPS WIDTH: _____

SHIPS SPEED IN 100': _____

RADIO FREQUENCY: _____

RADIO TYPE: _____

EXTRA FREQUENCIES: _____

By Bart Purvis

Here are some building hints and ideas from experienced, competent builders that I have picked up over the past year at regional and national meets. Hopefully they may be of some interest to other newcomers.

Grossadmiral Fleugel: Position your radio on/off switch so that you can easily turn the radio off before lifting your sunken ship out of the water. This prevents a "nervous" servo from accidentally firing the guns before you can pin them.

Stan Watkins: Transparent tapes with dots or dashes from Chart-Pac or Letraset makes quick and neat windows and portholes that are very realistic. These tapes are available from artists supply or drafting supply houses.

Charlie Griffin: No room for a watertight box? Just pack your receiver or servos with silicon grease and that old demon moisture is held at bay. Charlie uses Dow-Corning Dielectric #4 Compound which is available from large electronics supply houses. Other brands are available from scuba diving shops and swimming pool supply houses. Silicon grease will not harm delicate parts, is easily placed in the receiver or servo housing and provides positive protection from water.

Scale Ship Modeler: Pieces of fiberglass cloth may be held in place with 3-M #77 spray adhesive. The adhesive, available from Ace Hardware, firmly holds the cloth in place yet the cloth can still be moved and smoothed until

it is exactly where you want it.

Bart Purvis: After loading a gun you should replace the magazine loading cap before test firing, else you will be rewarded with a rather spectacular copper shower.

Frank Pitelli: BB holes in the bow and stern allow more water into the ship because movement forces more water into holes in these areas. Frank decreases spacing between ribs in the bow and stern thereby increasing hard area to help in deflecting BB shots.

Buddy Friend and Greg Wilson: The guys in Florida's Task Force 144 have located a really neat and inexpensive speed reducer. Ask your auto parts supply house for a Phillips or Borg Warner VR-1 voltage reducer. After discarding the metal covering you will have a nichrome wire resistance coil housed in a ceramic heat dissipating unit. Wire the VR-1 between the battery and the throttle control for an easily adjustable speed reducer.

Steve Baker: Although a natural inclination is to skin the hull of your ship as soon as the framework is completed, you will find that construction of motor mounts, gun placement, watertight box construction and placement and a multitude of other required construction steps is so very much easier without a fragile 1/32" balsa skin in your way. Steve recommends that skinning the ship be one of the last things that you do before painting the hull.

Rick Whitsell: A material called plastic canvas makes an ideal material for internal armor in Rick's ships. The material is light, easily cut and shaped and very tough. It is readily available at sewing shops, K-Mart or Wal-Mart stores.

HULL BUSTERS

3524 GRAY DRIVE
MESQUITE, TX 75150

Hawkins, 1930

