Rowboat Motor Journal

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Southern Ontario Rowboat Motor Chapter

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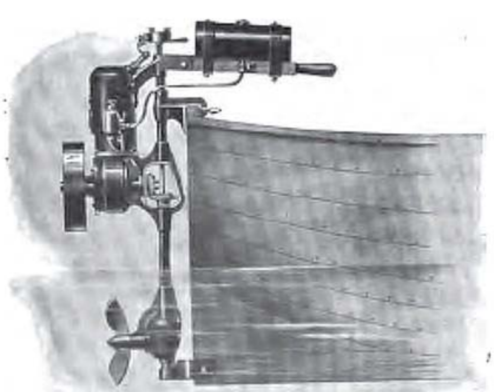

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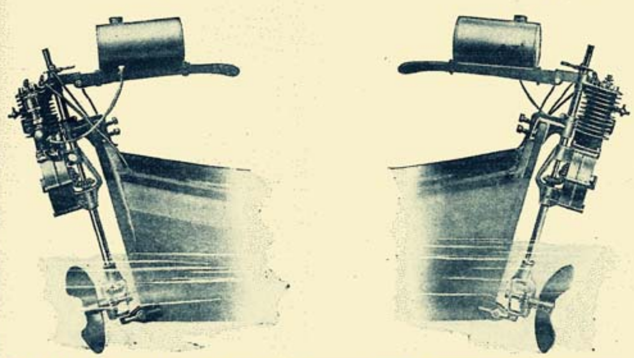

TWO VIEWS—Right and Left hand side of motor showing manner of attaching to boat.

PRICE, **$50.00,** NO EXTRAS

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Fitted to any boat in three minutes—small wrench with motor only tool required.

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Reference, OLD DETROIT NATIONAL BANK, Detroit Mich.

Some early Waterman Porto Motor Advertisements (courtesy of Bill McIsaac)

THE ROWBOAT MOTOR JOURNAL

About "The RBM Journal"

The Rowboat Motor Journal was created in order to provide rowboat motor-related information to any and all interested parties, as well as be used as a means of communication between collectors of the early motors that form the foundation of the marine outboard engine industry as well as the original building blocks upon which our hobby is based. Intended for quarterly publication, it is a non-profit enterprise with all information (technical or otherwise) procured, verified within reason for accuracy, and assembled strictly through the work of volunteers.

To that end, participating members are encouraged to share their expertise and understanding so as to assist in the future preservation of not only the motors themselves, but the knowledge there-of. Members may be solicited by the Editor to assist with providing in-sight with respect to restoration techniques, part reproduction, shop practices, motor information and any other pertinent exchange of data, up to and including publication of donated pictures or images, detailed accounts of current restoration projects, recent "new" old motor discoveries or acquisitions, or pictorial demonstration(s) of rowboat motors on display or in actual use.

The Editor of the Rowboat Motor Journal and its contributors assume no responsibility whatsoever for any incident or injury that may arise from any use of information (in whole or in part) presented within the contents of this publication.

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From The Editors Desk….

I see by looking at the calendar that we're into the month of March already. Personally, I haven't made a lot of progress on my own motor projects, guess I better get moving before the season arrives and I find myself in the position of not having anything ready to run.

Wayne Schoepke was the first to provide the complete correct answer to the patent drawing quiz in the previous issue; Thomas Thorsen was listed as the assignor to the Submerged Electric Company, and received his patent in November of 1907.

After conferring with our Chapter Webmaster, its been decided to adjust the newsletter delivery so that it will be issued quarterly instead of every other month. Simply put, the original goal of bi-monthly publication may have been a case of over-exuberance on the part of yours truly. The months of issue will be coordinated so that it does not coincide with the months in which the "*Antique Outboarder"* magazine gets published. Thus, we will NOT be publishing the Chapter Newsletter in the months of January, April, July or October.

This edition of the newsletter is heavily weighted toward the technical end of things. After conferring with our Technical Consultant, it was decided to try and be as thorough as humanly possible with respect to providing information related to various magnetos. The result is a multitude of pages devoted to the subject, and I hope at least some, if not all, of it will be useful to somebody. There is a seven-page bit that I scanned from a technical publication would serve as a very good tutorial on flywheel magneto system fundamentals that will be posted at a separate link on the website as soon as we receive permission from the publisher who owns the copyrights.

With respect to the possibility of putting on a RBM Chapter meet somewhere, this is a notice that the Chapter has been invited to attend a wet meet function at Ford Lake Park in Ypsilanti, Michigan. This would be a jointly sponsored event with the Great Lakes Chapter as well as the Paquette Model-T Car Club folks. Last fall, an informal get-together with the car club proved to be very enjoyable for all. We took them for boat rides with our old motors, and they reciprocated by taking us out for spins in their Model T Fords, with the plan to do more of the same next summer. The event is scheduled for Saturday, August 22nd, 2009 and would commence in the late morning with the main activities taking place between 12:00 noon and 5:00 PM. At that time, the plan is to stop for a pitch-in community supper, probably with something BBQ'd as the main course. Ford Lake is a very nice inland body of water with good launch facilities at a nice clean park with covered pavilions and cooking grills, so it has the potential to be a great spot to hold a wet meet.

At the RMJ, just like the TV networks we're not immune to re-runs, as I'll repeat this item from the last column; next year at Tomahawk is the 100th anniversary for Evinrude. It would be very cool to have a decent sized contingent of RBM fanatics at the meet in Wisconsin. It's going to be a big show, with meet attendees coming in from all corners of the country. The meet opens July 29th and runs to August 1, 2009. Hotel space in Tomahawk is limited, so reserve your room(s) now instead of waiting until the last minute. Last year I made a spur-of-the-moment decision to head out there and after arriving at 1:30 AM CST after an 11 hour drive, ended up spending the rest of the night folded up the back of my wife's Ford Escape; luckily Wayne Schoepke offered me the use of the spare bed in his hotel room so I could get a decent nights sleep before heading back home.

I've been doing some work on trying to put a list of identifiable features that could be used as reference in attempting to figure out the likely year of manufacture of Evinrude rowboat motors that lack an ID plate on the gas tank. It won't be perfect, but hopefully it will be useful when it gets printed in a future issue. I'd like to hear from some other folks who have input to offer, whether it's covering Evinrudes or any other brand of rowboat motor that can be tricky to identify, we could really use some help on that one. ☺

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RBM Checklist (continued)

In the previous edition, the subject of a battery ignition setup was discussed only briefly. Since in many cases the ignition system is really the determining factor as to whether a given motor is going to run well or not at all, it was decided to maybe backtrack a bit and include a little picture in order to try and make it as informative as possible.

Jack Craib had posted a digital picture of a diagram that detailed a proven method of wiring up a buzz coil and battery that should be capable of providing an operational ignition system for any single-cylinder rowboat motor, and here is a reproduction of that sketch to use for reference.

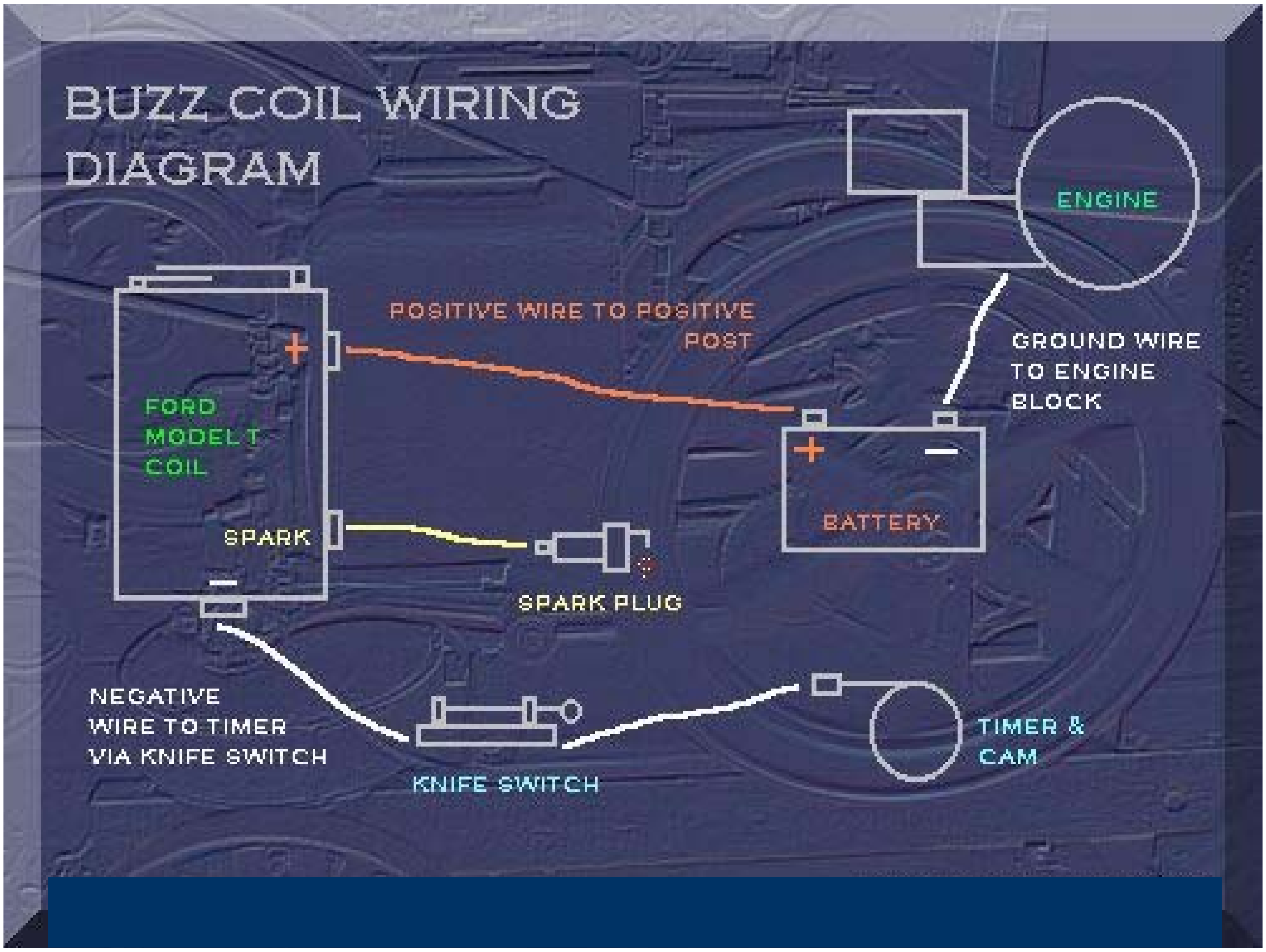


Figure 1 - Sample Of Buzz Coil Wiring Diagram (courtesy of Jack Craib)

This particular wiring diagram is simple and easy to understand. The implementation of some sort of on-off switch is also a good idea for any battery ignition installation. Bear in mind that with the power supply turned on, any time the points come together it will complete the circuit necessary to fire the spark plug. The firing continues for as long as those points are together; therefore, since the cam lobe is configured in such a way as to provide a certain amount of dwell time for the points, it means that a case where there is 10 degrees of dwell time that the spark will be provided for 10 degrees worth of engine rotation. The timer point setting is not as critical, you can “ballpark” it and still get the motor to run. This differs greatly from flywheel magnetos, which only provide spark for one short instant as soon as the points open, and the point gap has to be precisely adjusted and maintained within a couple of thousands of an inch of the specified setting if you hope to get a good hot spark out of it at the proper time.

Speaking of the flywheel mags, we’re going to take a closer look at the unit typically found on mid-teens Evinrude Detachable Rowboat motors. The magneto pictured fits on a motor owned by Roger DiBiasi, who was kind enough to allow us to use it as a guinea pig in order to conduct our evil experiments.

Flywheel magnetos will typically work in a manner that is not easy to describe, as least not for someone of my limited mechanical background. So, what I’ll do is scan some information from a technical publication (and post it on the website separately) to help educate those who don't already know the principles of magneto operation. What I can tell you (and the book doesn't) is that a critical element in making this system work is proper position of the ignition points. Each magneto has its points anchored in exactly the best position relative to the rest of the magneto for maintaining peak functionality so that the points open at precisely the right moment to produce a hot spark; if the point orientation is off and contact point opening does not occur at the correct phase of the magnetic field reversal, either you will have a no-spark condition or an ineffective spark will be produced. I found this out the hard way in an Evinrude Model "N" where the original worn-out points had been replaced with a set that was "close to" but not identical to the original part. It was off just enough to cause a problem that was so infuriating it just about had me ready for admittance to a rubber room.

Even most beginners know that an ignition spark is produced when the points "break" or open up. What they may not realize is that the points can be in the right position with the gap set correctly, but if the magnets are out of sequence because of an improperly positioned flywheel or a sheared/damaged flywheel key, you'll still have a condition that contributes to a no-run situation. That is one of the reasons that it was mentioned in an earlier edition that it is so important to make sure your flywheel key areas are undamaged and the flywheel tightened down securely in the correct position. If it hasn't been written before, let's cover this now; **the flywheel nut should be the tightest fastener found anywhere on your rowboat motor.**

With respect to the magnets themselves, it is not uncommon to find flywheel magnets that have lost much of their magnetic pull over the years. This is a phenomenon typically found to exist in motors built prior to the use of Alnico magnets, which were introduced in the 1930's. Happily, it is a condition, which is easily correctable by simply recharging or re-magnetizing the weakened inserts on a special apparatus designed for the purpose. Now at the risk of being found guilty of false advertising, I had promised a pictorial demonstration of how this can be done; however, I had decided to devote more time and effort with respect to magnetos and how they work, thus it appears that I'm running out of space, so that item will have to be picked up again in a later issue. For now, we're going back to Roger D's magneto.

Examination of this magneto shows that the primary and secondary windings are separated instead of one being wrapped around the other such as you'd expect to see in a more common coil assembly. This doesn't have any particular advantage over the more compact version; it's simply how they designed the coil windings in the first place. The windings share a common pole or lamination bar, so that principle remains unchanged. The windings are buried inside an insulating tar-like material (or "pitch), which is OK to look at but is no fun to tackle if one has to dig through it to search for open windings or shorts. Fortunately for Roger, this coil tested OK on the Merc-O-Tronic, and thanks to the expertise of our Technical Advisor, we'll walk you through the procedure used to perform that test safely and without risk of damage to this aged ignition coil.

To start with, the condenser has to be isolated from the rest of the ignition system. This is easily accomplished by merely removing the screw that held the condenser in place on the mag plate and sliding a piece of cardboard to sit in between the condenser and mag plate surface. Next, the magneto plate is flipped over and a jumper wire is used to bridge between the two terminals visible on the underside of the high-tension lead block (the part where the spark plug lead comes out of). Normally there is a brass strap that connects these terminals, but it was missing off this motor so we had to improvise. Next, flip the mag plate back over again and determine which lead is your primary winding wire. Clip the red (positive) analyzer alligator clip to this lead, and apply the black (negative) alligator clip to ground. Any good contact surface on the map plate will suffice as a ground contact. Next, clip the coil power test lead from the Merc-O-Tronic to the secondary (high-tension) lead; this will be the lead from your coil that goes to the spark plug. Now you're almost ready to turn on the power, but before you do make sure again that the condenser is isolated from the mag plate and cannot come into contact with any metal surfaces. From here, it's a matter of turning on the juice and watching the display window in the analyzer to see if any spark is produced that can jump the gap in between the electrodes visible through the tester glass. You may need to crank up the power knob in order to stimulate the coil into producing fire. With all connections in place, having to turn the power all the way up before a spark is produced is not good news, as it means the coil will tend to draw too much amperage in order to fire a plug under compression. Obviously, cranking up to maximum power and not getting any spark is the worst news of all (and it happens a lot). If this happens, you can either decide to go the "authentic" route and have your coil rewound by a specialist in this field (expensive) or get around the problem by using a buzz-coil apparatus (cheaper). Assuming the spark is produced, check the analyzer meter to see how much power it actually takes to make the coil produce fire. The lower the amperage needed, the better off your coil is. Roger's coil fired while drawing less than 2 amps, and we considered that to be very good. Here are a couple of photos showing how things were wired up for the power test. As with any type of test equipment using electrical power, always proceed with caution. (Thanks to Bob Skinner for demonstrating the proper technique).

Figure 2 - Underside of 1917 Evinrude Detachable Rowboat motor magneto. The round black terminal block has two terminals that are being bridged with a jumper wire. Note the points visible just above the terminal block.

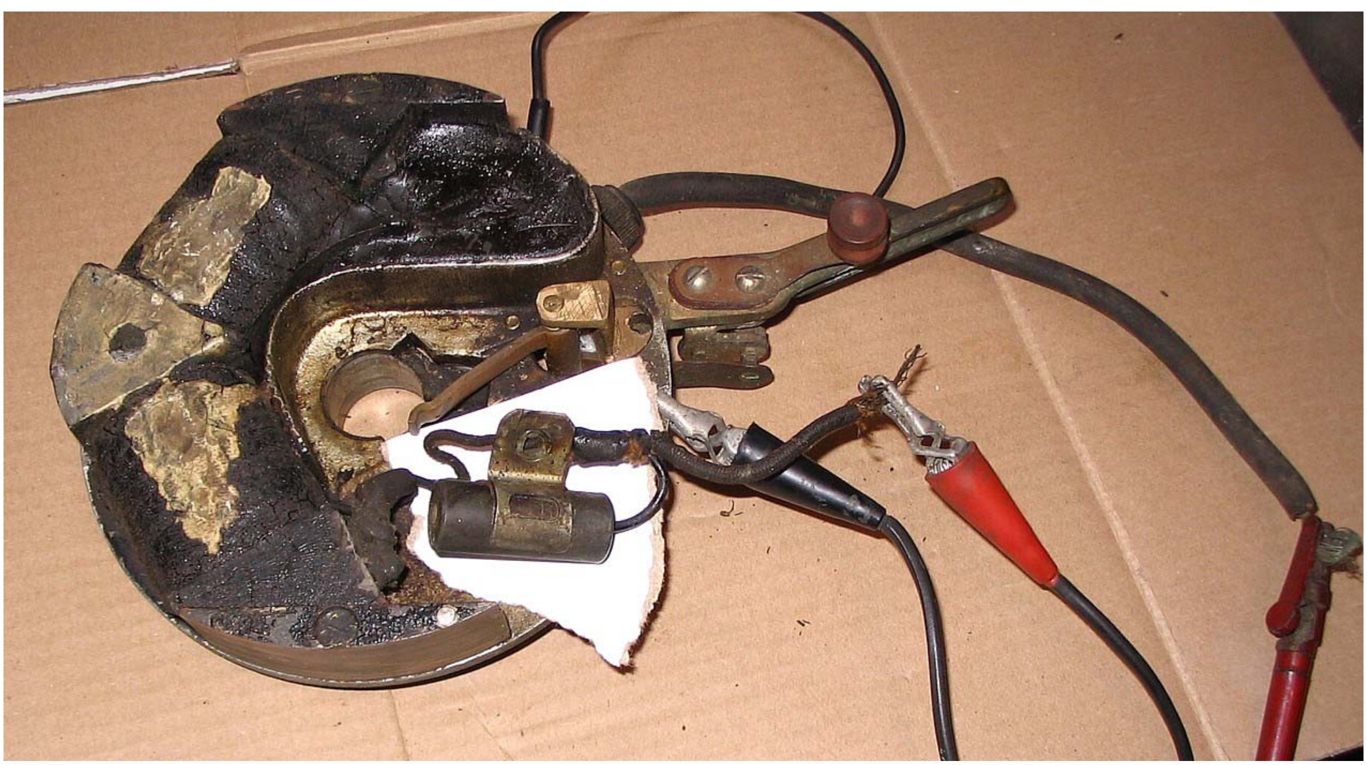


Figure 3 - Magneto ready to have the coil power tested. The white cardboard is isolating the condenser from the rest of the magneto assembly. Using clock positions as reference points, the coil windings are located at 11:00 (secondary) and 8:00 (primary) positions respectively. The black substance in the winding pockets is the insulating tar or pitch. The coil test turned out good, but further testing revealed that the condenser was faulty. The condenser in the photo is not an original part; some Evinrudes had condensers that were rectangular in shape.

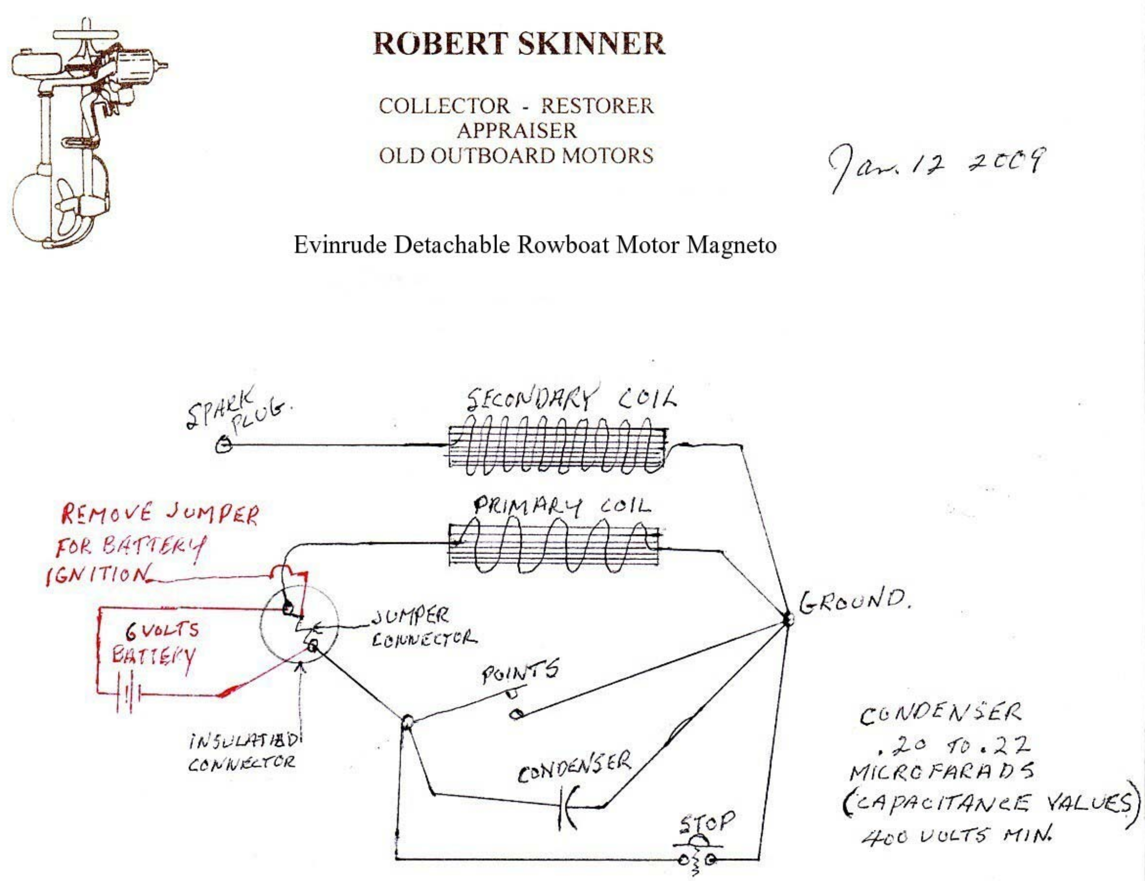


Figure 4 – Schematic diagram of a typical Evinrude Detachable Rowboat Motor magneto. This shows how to use a 6 volt battery to give the flywheel magneto a boost. Evinrude advocated this method for situations (damp weather) where the flywheel magneto needed "assistance" to make the motor easier to start.

Figure 5 - Merc-O-Tronic Magneto Analyzer Model 98 - a very useful tool for testing almost any antique motor ignition system. The coil power test requires the use of a 7.5 volt battery; other tests are performed using regular 110 household voltage.

Gear Driven Magnetos – these distinctive looking units, many with a horseshoe magnet visible on the exterior, are driven by power transferred from a rotating shaft (usually the crankshaft) through a set of gears and additional shaft. In some instances like the later Waterman, Sweet, Ferro, and some Wisconsin motors, the magneto shaft is perpendicular to the power supply shaft. In these cases, bevel gears provide the method for transferring the rotation from the crank to the magneto. Motors such as the Caille Liberty Twin have a magneto situated in a manner where the mag shaft is parallel to the crankshaft, and in this case a set of helical gears are used to spin the magneto shaft. However which way the unit is geared, the operating principle remains the same; a rotating element (or armature) containing the coil windings is spun inside a housing with the magnetic pole shoes located exteriorly on either side. One end of the armature contains a condenser, with the other end forming the commutator area, providing the contact area for the high-tension leads that serve to conduct the flow of electricity to the spark plug(s). The spark plug wire hooks up to this point by plugging into a receptacle (usually Bakelite) that has a spring-loaded carbon brush riding on the commutator surface. On the far end of the magneto shaft opposite the commutator, one would find the ignition points, usually located under a protective enclosure of some sort. The points in these mags are fastened to the armature shaft, thus it goes without saying that the points rotate around the shaft axis instead of being stationary and being actuated by a cam or rotor; this means that a different method of opening and closing the points had to be devised. Magneto manufacturers accomplished this in various ways, but the end result is the same. Many magnetos got the job done via the installation of a stepped ring that is fixed in place and surrounds the rotating point assembly. The step in the ring acts as the point actuator, causing the points to be opened or closed at the appropriate times. This ring could be pivoted a limited amount in order to either advance or retard the spark, thus facilitating some degree of engine speed control. Depending on the application, these compact units are capable of providing enough spark power to fire two or more spark plugs; for multi-cylinder engines, it would simply be a matter of installing a point-actuating ring with enough lobes to accommodate the motor. An improved example of this principle was applied to the magnetos built for automotive use. In these cases, the coil was removed from the armature and was stationary while the magnets did the spinning, with a multi-lobed cam affixed to the end of the rotating shaft, the purpose of which was to actuate the breaker point assembly that was fixed in place.

Some of the advantages of using a gear-driven mag ignition system would be that it was neat, compact, reliable, and efficient, and for the most part the only external wires visible would be the spark plug lead(s) and possible a ground wire. Some of the disadvantages would be the additional moving parts (gears that could wear), and the added chore of making sure the gear timing was put back to an optimum position should the magneto ever be removed from the engine for service or replacement. A distinct disadvantage was the fact that the rotating elements as built could only be expected to withstand a certain amount of centrifugal force, and proper balancing of the rotating armature would have been of some concern. Even with the balance optimized, these units most likely would not withstand high RPM operation for long, which suited sub-1000 revolution per minute rowboat motors fine but would not be so desirable in other applications requiring greater engine speeds.

There were a couple of sample gear-driven magnetos available to look at; one that I'll take apart to illustrate the different internal parts belongs to a Swedish-built motor I brought home a few years back from the Netherlands while visiting relatives over there. My wife is Dutch, but all my in-laws are in Europe (not such a bad deal, eh), so making a trek to the Netherlands is a must every once in awhile. Anyway, on one of those trips I managed to find some time to pay a visit to club member Kees Alderden who was kind enough to sell me one of his many antique motors of European descent, which in this case happened to be a "Svalan" outboard of mid-to-late 'teens origin. The motors name is derived from the Swedish word for "swallow", a common type of bird. This 3-½ HP single cylinder motor uses a magneto that is identified only with the words "AB-SVENSKA ELEKTRO-MAGNETER", which turned out to be the name of the company that built it. Underneath those words appears the letters "AMAL", which is the city in Sweden that is/was home to the company; and no matter how I troll the Internet, I cannot find any additional information on this magneto or the organization that made it. Other marks on the mag casing indicate that it is a "TYP F/1 L". Now what that's supposed to mean, I'll wave the white flag right here and admit I have no clue. Typical of other magnetos I've seen on European rowboat motors, this mag possesses the capability of providing spark for two cylinders if it was used on an opposed twin engine; since its mounted on a single cylinder motor, one of the high tension lead ports is plugged off and not used. This is done exactly the same way on the Bosch mag that came with my German-built Effzett rowboat motor.

The pictures show the magneto fully assembled, then broken down to individual parts. This particular specimen has a good hot coil but a bad condenser, so that situation has to be rectified before it can run a motor, but its good enough to use as a demonstrator. This unit also works a little differently inasmuch as the point actuator is a stepped ring that lifts on the point tension arm from underneath and keeps the points open, then allows them to close when the point tension arm passes over the stepped area of the ring. I'll plug in a picture of the points on the Bosch magneto as a comparison.

Figure 6 - Svalan magneto assembly, note the driveshaft with bevel gear on the far left. This mag is mounted on top of the cylinder and is driven off a bevel gear pressed onto the flywheel hub, necessitating the long shaft.

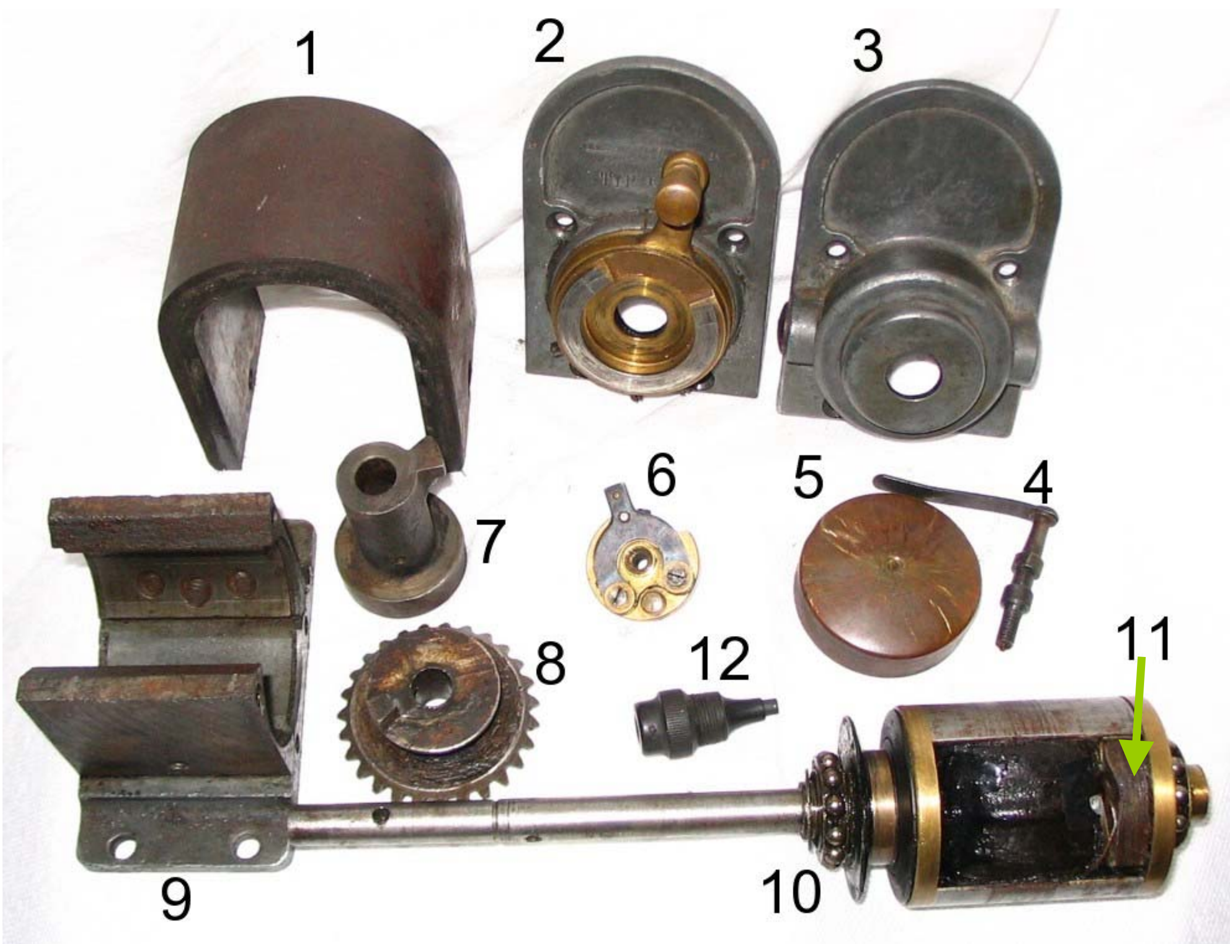


Figure 7 – Major magneto components - Horseshoe magnet (1), End caps (2 & 3) Point Cover Retaining Arm & Cover (4 & 5) Ignition Points (6), Counterweight and Bevel Gear (7 & 8), Magneto Housing Base (9), Rotating Armature & Shaft (10), Condenser (11 with arrow pointer) and High-Tension Lead Receptacle (12). Armature is supported by ball bearings on both ends of the rotating element; outer races are pressed into the end caps.

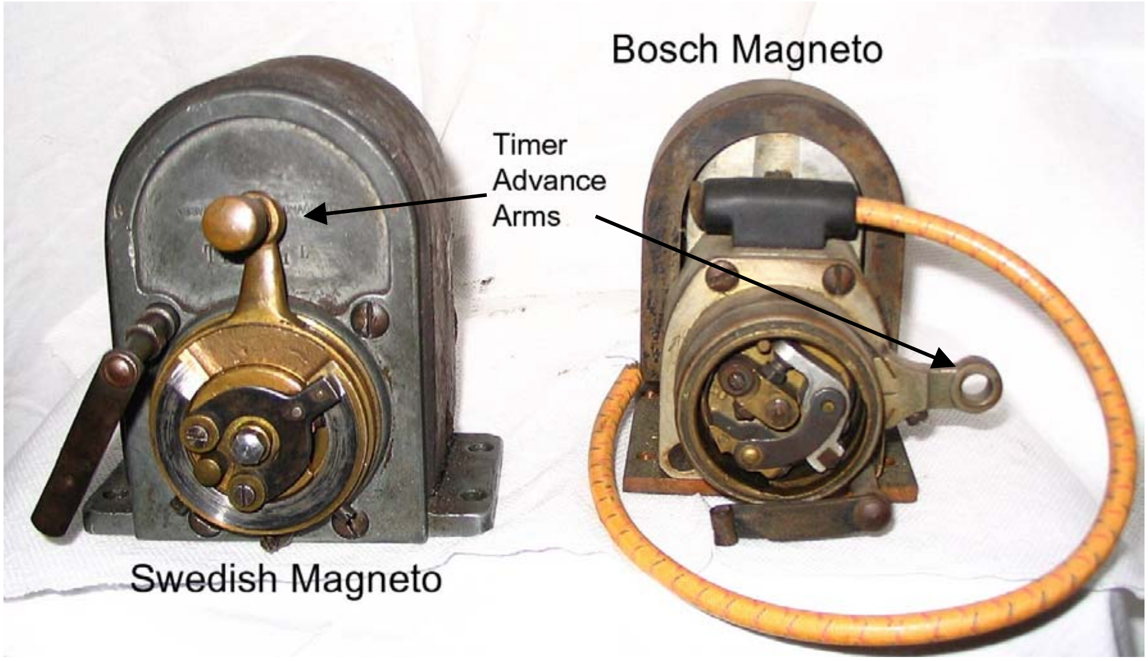


Figure 8 - Swedish mag on left, German-built Bosch mag on right. There are some differences in how these are built, but they do the same job; supply a hot spark to the plug. The Swedish unit uses a stepped ring to actuate the points by lifting the point arm from underneath; the Bosch uses a stepped ring that squeezes the point arm from the outside. Also, the commutator end of the Bosch is on the opposite end of the mag when compared to the Swedish magneto. Note that the Bosch mag is only providing spark for one high-tension lead but has the capability to supply two.

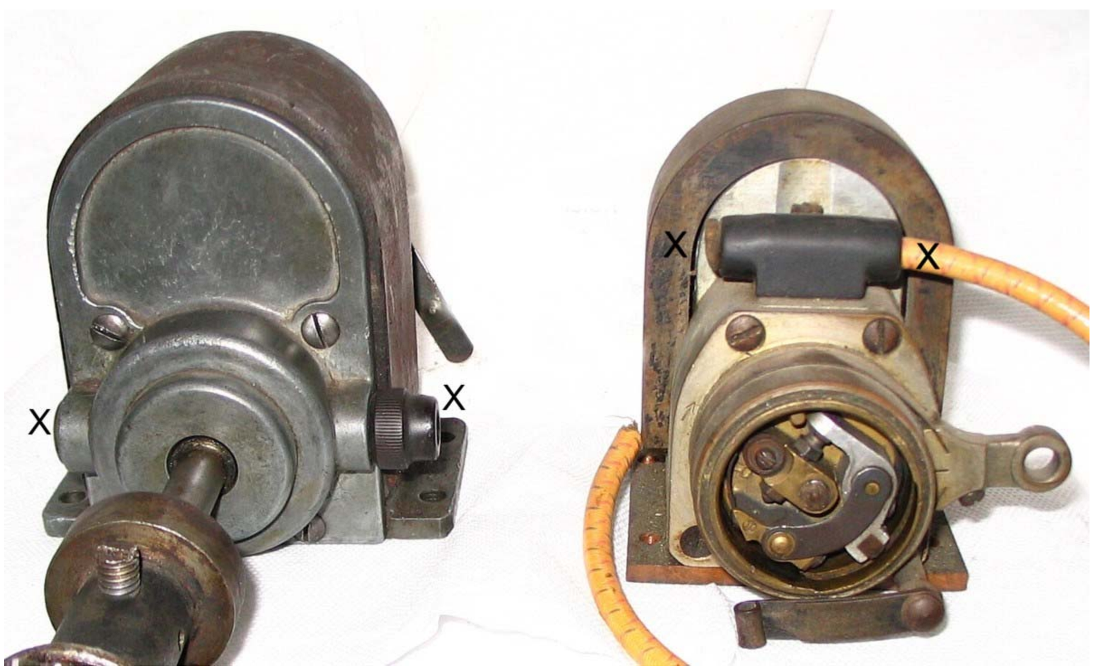
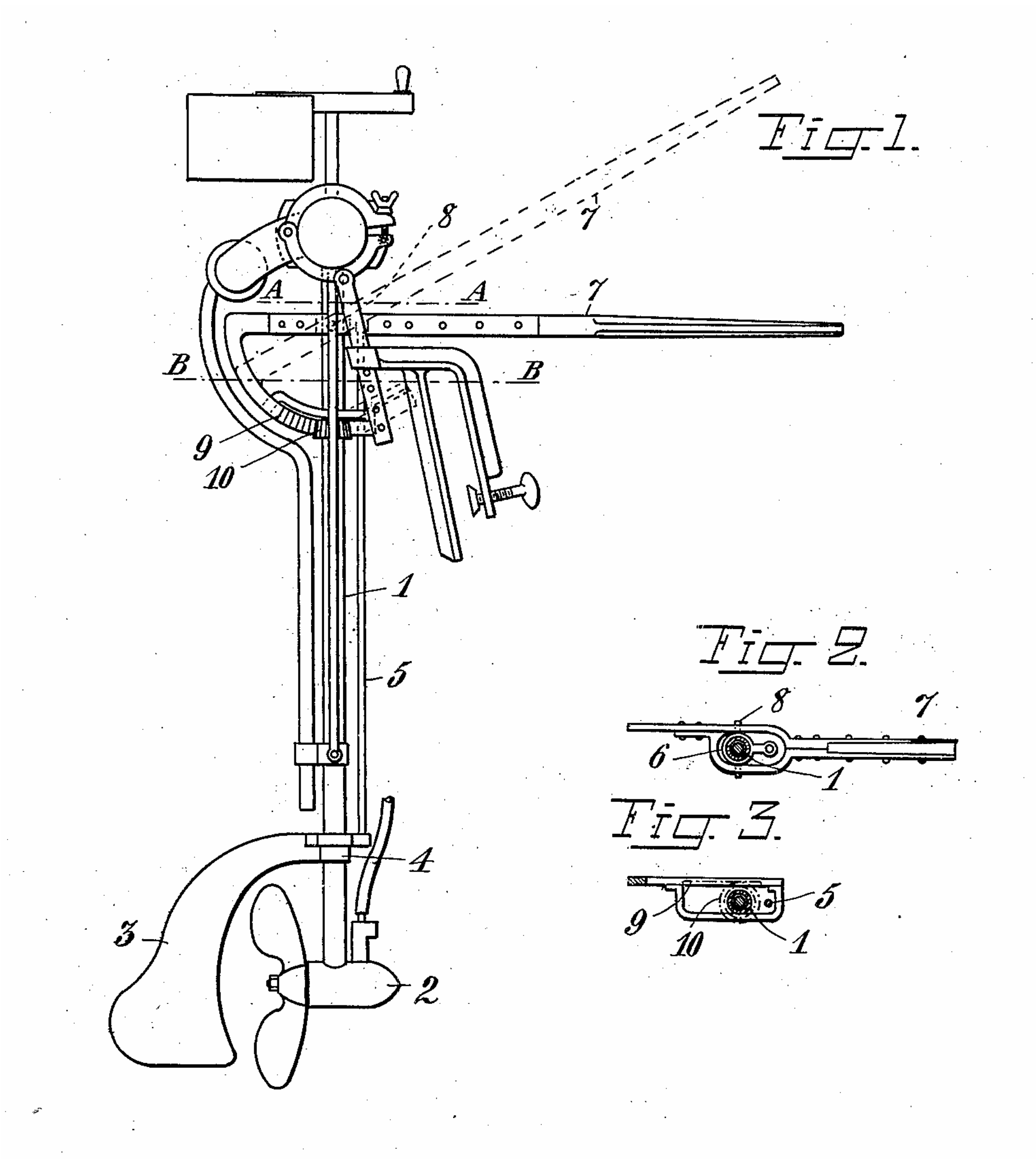


Figure 9 - I flipped the Swedish mag end for end to show the high-tension lead ports. Again, it could feed two spark plugs but is only being used to fire one. (The high-tension lead termimals are marked by "X's".)

That's all for this edition of the RBM Checklist, if anybody finds something wrong with what they read here or have some suggestions for improving this column, please feel free to speak up, you won't hurt the authors feelings because accuracy is what we're after here, and fresh ideas are always welcome eh! In the meantime, for the next issue, I honestly have no idea of what is going to be covered next!

THE BACK PAGE

FEATURING ROWBOAT MOTORS OF INTEREST



Here's another drawing for a device that was patented as a boat propelling mechanism. This time you get a free hint; it may or may not have been patented in the United States of America. Name the inventor, country of origin, and the concept of the patent.