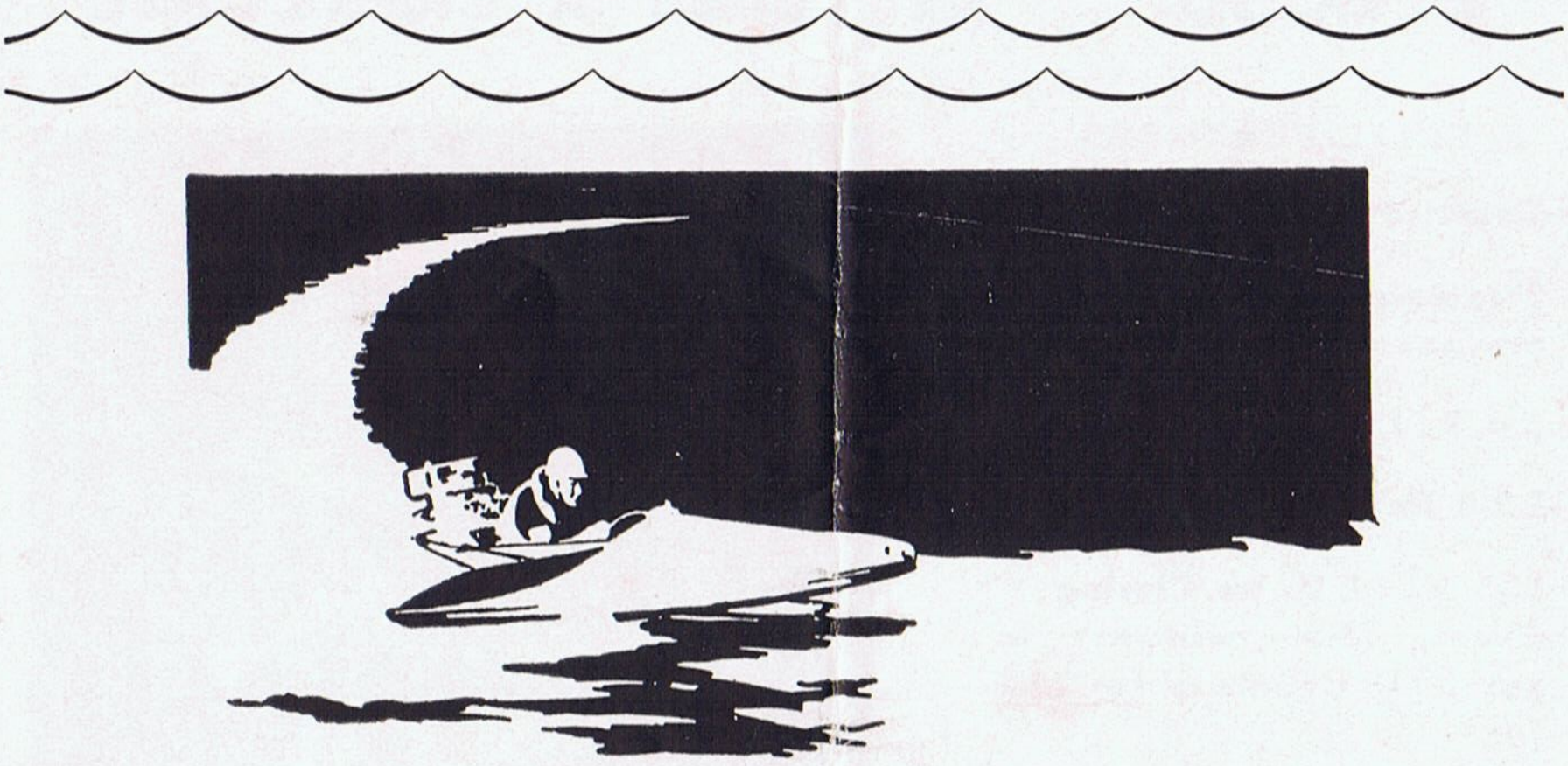


LAST WORD

RACING EQUIPMENT

"THE CHOICE OF CHAMPIONS"

Manufactured by

MUSKEGON SPECIALTIES COMPANY

OUTBOARD

SPECIAL "KR" CLASS "A" CRANK CASE

SPECIAL FEATURES

1—Oversize Ears and Bosses

2—Strategically located ribs to prevent distortion.

3—S.A.E. Carburetor Flange

4—LS-9 Ballbearing Boring

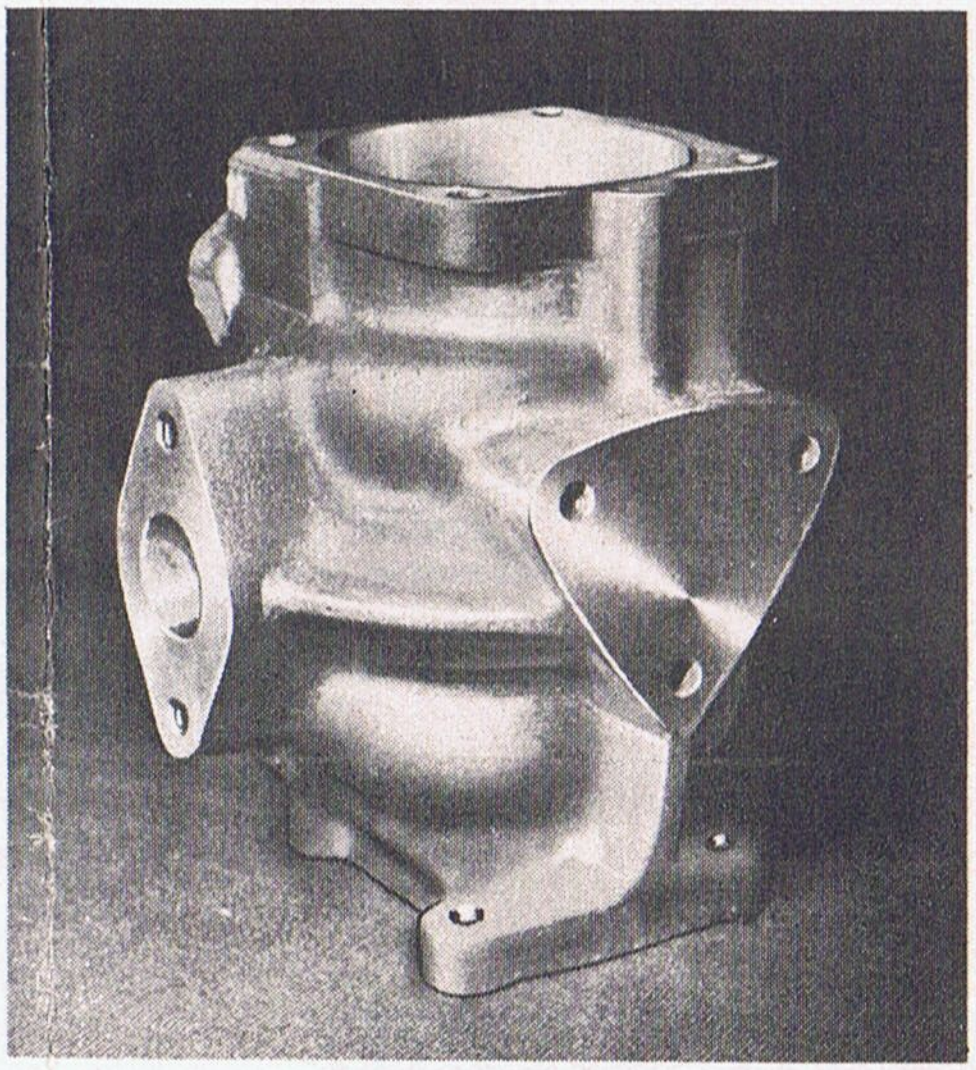
5—65° ATDC Rotor Closing Event. (Not necessary to cut STD Cr'kshaft for timing).

6—Hi-Tensile Alum. Alloy

7—Tuned Induction System

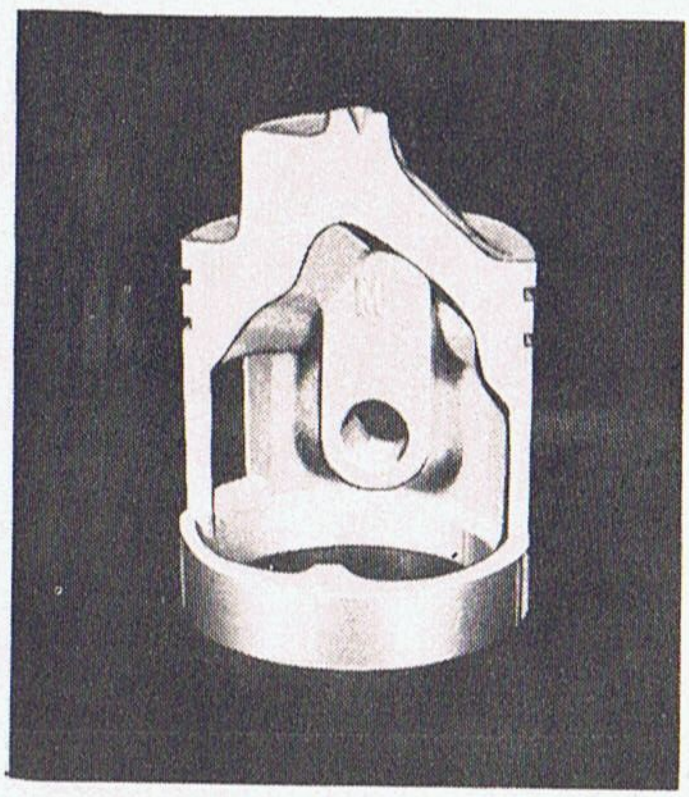
Price:

Finish Machined $50.00
With Rotor Babbitted $60.00
Rough Casting $14.95



RACING PISTONS A-B-C

FOR JOHNSON MOTORS



SPECIAL FEATURES:

1—Special Low Exp. Alloy

2—Porous Surface, Better Lub.

3—Low Expansion Coefficient

4—Hi Thermal Conductivity

5—Minimum Distortion

6—Struted Piston Pin Bosses For Strength and Cooling.

7—Efficient Deflector Dome

FURNISHED IN SEMI-FINISH ONLY .060 OVERSIZE, NO RING GROOVES.

PRICE:

A—$4.75
B—$5.00
C—$5.50

NOTE:—SECIAL CLASS "B" PISTON AVAILABLE WITH EXTRA FULL EXH. SIDE FOR USE WITH "DISHED OUT" CYL. HEADS.

WHAT MAKES A RACING PISTON?

A piston in an internal combustion engine has three main duties to perform:

1 — To transmit the energy released from the combustion of the fuel to the connecting rod.

2 — To form the base of the combustion chamber

3 — To transfer the heat generated by the combustion process to the cylinder walls.

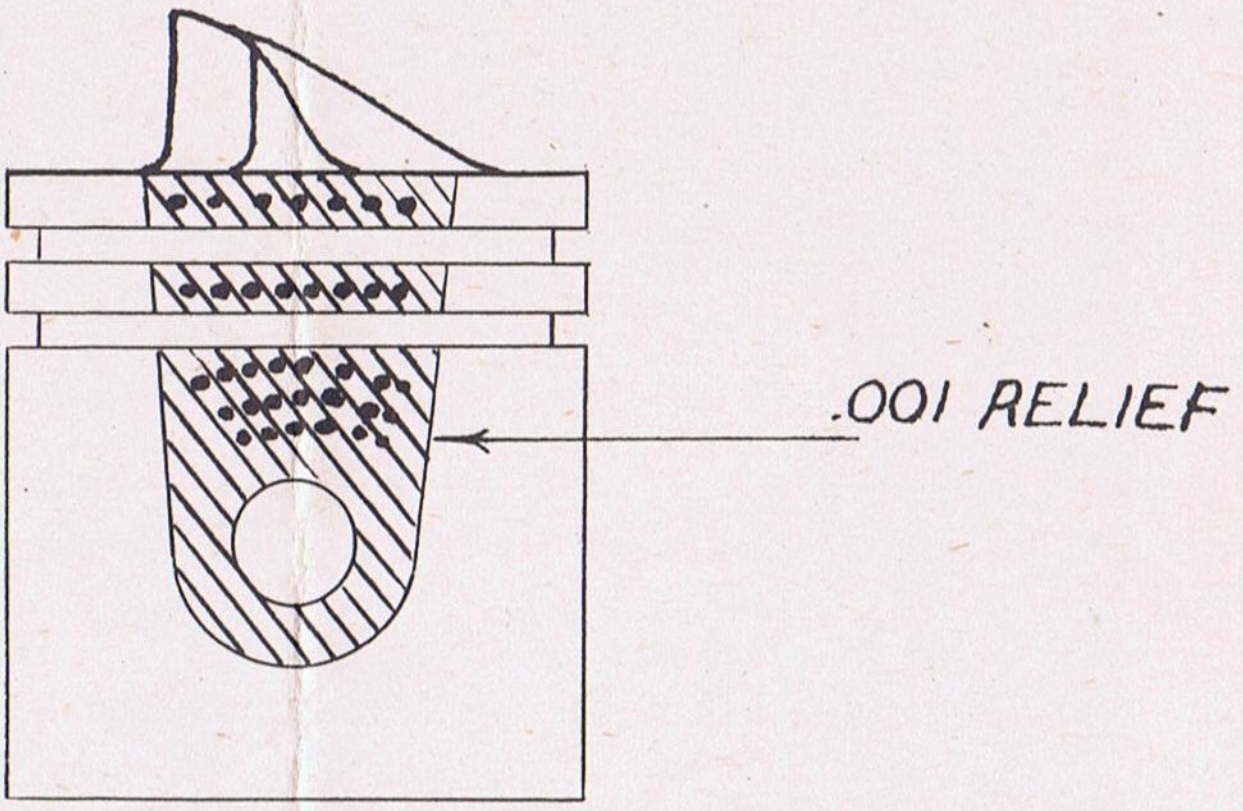
In a piston designed for racing the second and third play a more important part than in ordinary service. In a 4-stroke cycle engine the shape of the piston head is usually flat or domed shaped, but in a 2-stroke cycle engine the baffle design of the piston head controls the proper scavaging process within the cylinder and for this reason must be worked out with the utmost care. The big difference in pistons, however, is in their ability to transfer heat. A piston made of gold or copper would be very good in this respect, but as it is also a reciprocating part its weight must be kept at a minimum and therefore it becomes a compromise. The following 4 metals are the main ingredients used in our pistons: Copper, Nickel, Silicon, and Aluminum. Copper is high in heat transfer qualities; Silicon controls expansion due to heat; Nickel produces hardness and strength; and Aluminum gives body with a minimum of weight. By blending these metals in the proper proportions a metal is produced that is high in "thermal conductivity" and yet has a moderately low coefficient of expansion.

The method of manufacture also has a great effect on high output pistons. By far, the best way is by the drop-forging process. With this method the molecules are driven closer together forming a denser and stronger metal. Being denser it is capable of transferring heat more readily, but the equipment involved is too expensive to be practical for our purpose. Permanent mold castings are used to a large extent in automobile and light-duty applications as they are cheap and can be turned out in quantity with very little machine

work, but as only certain metals are satisfactory for "die-casting," it isn't desirable for racing pistons. With sand-casting, the process by which our pistons are made, it is possible to use the desired "mix" of metal and also incorporate minute pores in the surface. These pores collect oil when the piston is operating which in turn helps to lubricate the sliding surfaces and reduces piston friction. The disadvantage of this type is that the interior and unfinished parts do not have as smooth a finish as with the other types of manufacture.

In air-cooled engines such as motorcycles it is necessary to grind the piston to a cam shape with one side as much as .022 larger than the other. The reason for this is that the pin bosses having more metal than the other side cause the piston to absorb more heat at this point and therefore expand more in this area. To satisfy this condition a certain amount of metal is removed at this point so that when expanded they will be round. Fortunately outboard pistons are not subjected to so severe a wall temperature, but nevertheless, a certain amount of distortion is present at these points. About 90% of all piston seizure is in this area. Cam grinding is not necessary or advised for outboard pistons as the amount .001 to a side, is so slight that it can be performed by hand with sandpaper or emery cloth. (See drawing on next page). Be careful not to over-do this or pressure from the crankcase will leak from the intake port across this section to the exhaust port. Small holes 1/32"-1/16" deep can also be placed in this area to advantage.

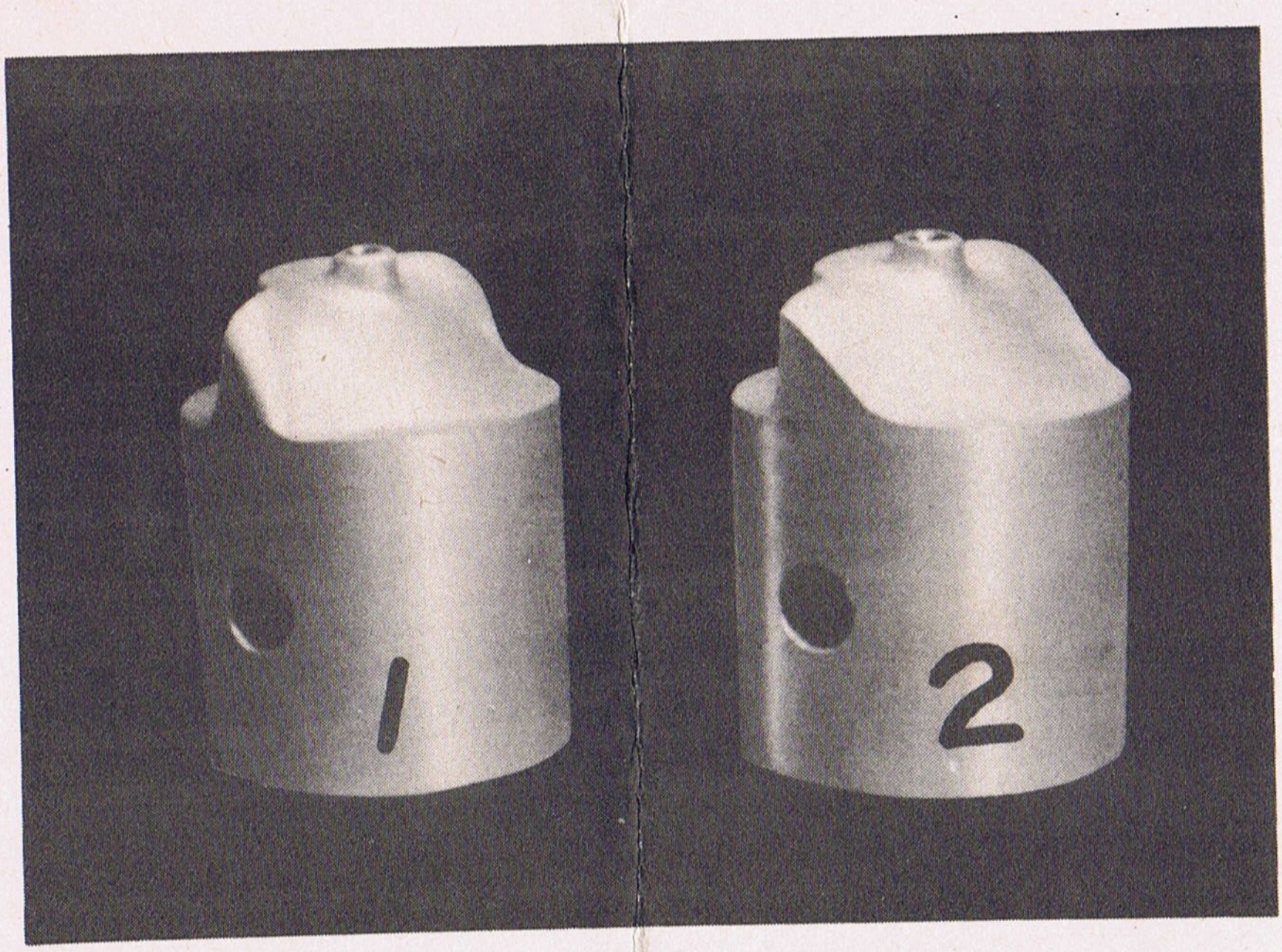
Piston Ring Location — It has been found in aircraft motors that the life of the top ring was greatly increased by lowering it down from 3/8" from the top of the piston to 1/2". It would be impossible to use such a wide fire-ring (the section of the piston from the top of the top ring to the top of the piston) on an outboard piston. However, the tendency should be to keep the rings low and apart as much as possible. (3/16"-1/4" fire-ring is sufficient.) If ring pins that are half in the groove and half in the piston wall are used, they should always be placed in the upper half of the groove. It is much easier to drill these before the groove is cut.



Compression Ratio — This is a matter of guess-work with many drivers and mechanics and as it is so extremely important it should be checked with as much care as any other part of the motor. A very simple method is to place the cylinder being checked on TDC and by using a burette or some other arrangement for accurately measuring liquids, fill the cylinder through the spark plug hole with light oil until it reaches the top of the hole. To figure the compression ratio divide the number of cc. by 16.39 which will give you the displacement of the combustion chamber in cubic inches. Subtract .12 from this and you have the combustion chamber volume without the spark plug hole. Now add this to the working displacement to the cylinder and divide the sum by the volume of the combustion chamber.

$$\frac{\textbf{Working vol. of cyl.} + \textbf{vol. of comb. chamber}}{\textbf{vol. of combustion chamber}}$$

The compression ratio has a direct effect on the heat developed and from our experience we recommend that the compression ratio with present fuels be kept lower than 12.6:1 with our A pistons and 11.25 with our B. Higher ratios may result in a burnt piston. The gain between 8:1 and 11:1 is only .03% so the risk is hardly worth the difference. However, it is very important that all cylinders have the same ratio.



Dished Out Heads — Some drivers prefer to "dish out" their cylinder heads and for these drivers we make a piston with a special designed baffle. The intake side on this piston is the same as our standard model, but the exhaust side is fuller, (see # 2 in photograph). With this piston it is possible to maintain a high compression ratio without making the head too shallow, also it increases turbulence at this point.

MUSKEGON OUTBOARD SPECIALTIES COMPANY
P. O. Box 426
Muskegon, Michigan

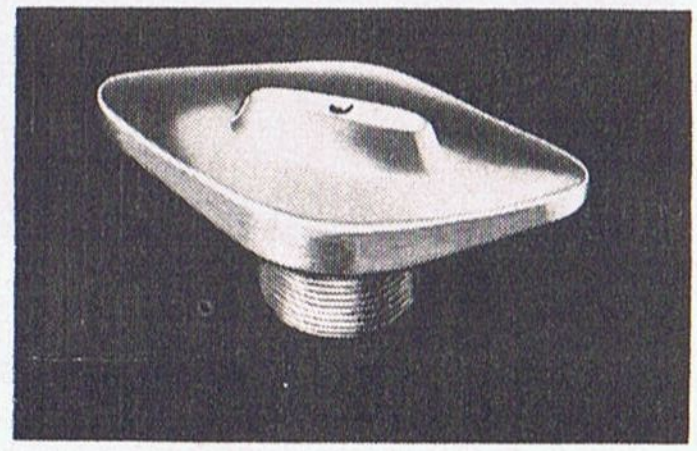
LUG TYPE GAS TANK

"THE KIND THAT STAY PUT"

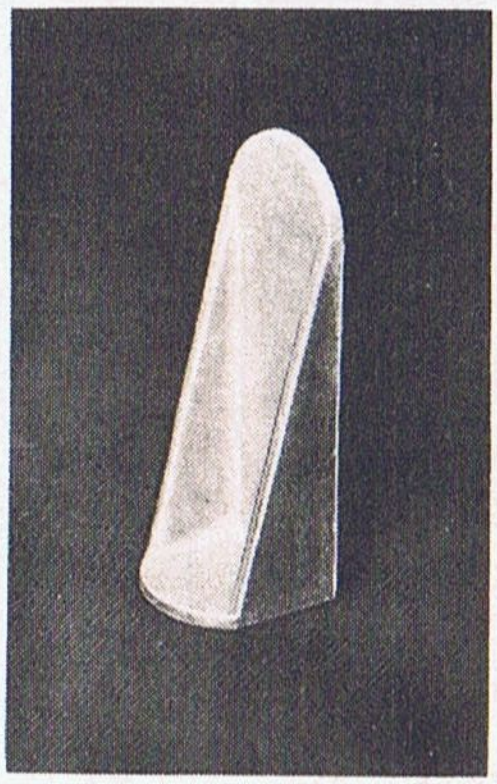
Spin in with the fingers and tap tight with wrench or pliers.

BRONZE $1.40 EACH

ALUM. $1.25 EACH



B and C GAS TANK EAR SUPPORTS



Replaces ½ Present Ear and Eliminates Further Breakage. Must be welded on.

Made of Exceptionally Hi-Tensile Strength Alum. Alloy.

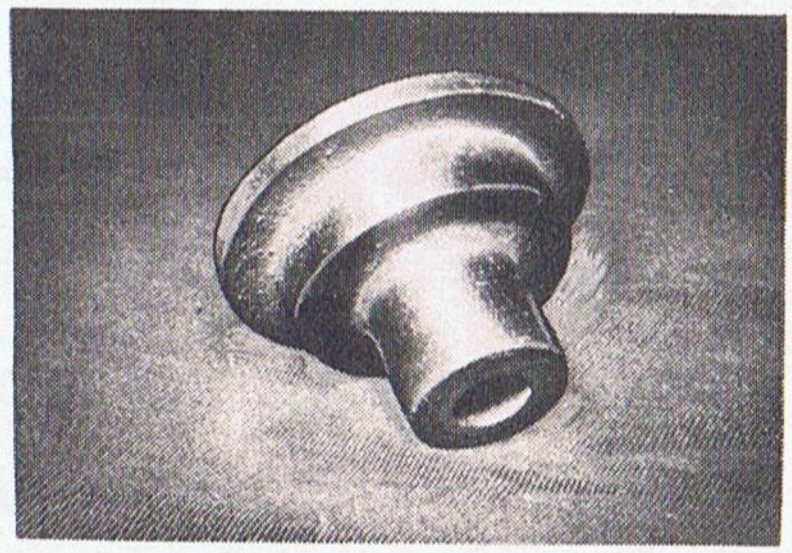
Each $.65

SPECIAL BEARING CUP CASTING FOR JOHNSON S, P, and PO MOTORS.

Enables installing ball-bearing in the crankcase head of these motors without welding.

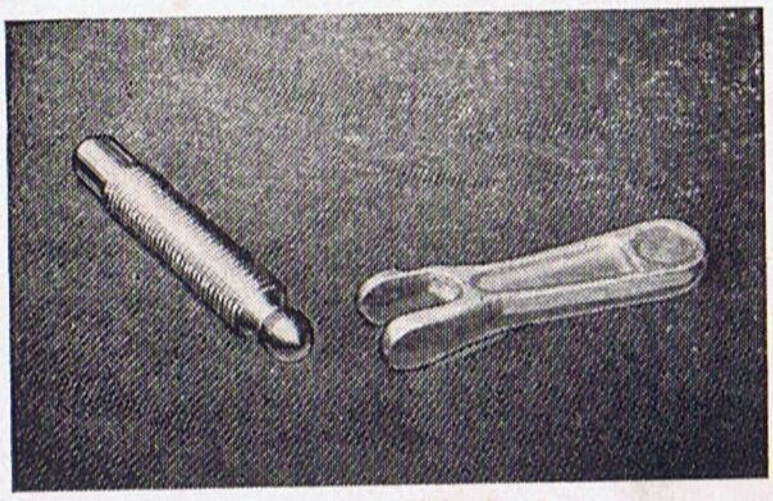
Installation Instructions included free. Must be machined.

Price Each Bronze—$2.50



CLAMP SCREWS AND HANDLES

"Replace For Safety's Sake"



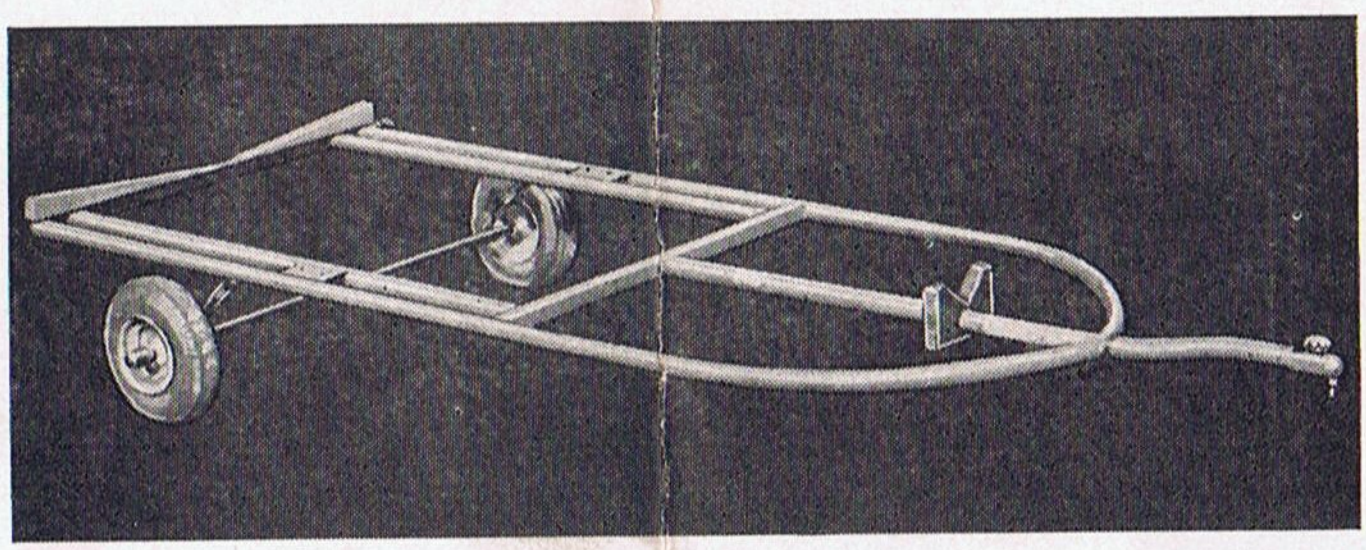
Handle Price Rough . $.25

Bronze Clamp Screws

Price Not Drilled—$1.25

SPEED-LITE RUNABOUT TRAILER

"Rides Like A Dream."



Capacity 500 lbs. **Price $99.95 Complete** **Extra Long $109.95**

Can be Pulled at Any Speed. **Write for more information.**

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QUALITY **DEPENDABILITY**

Also Manufacturers of Speedometers, Throttles, Accessories, and Hardware.

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