“Digeridoo” Model Pulsejet Construction Notes

IMPORTANT: Read all notes and drawings. Plan each fabrication procedure before commencing any work.

Item 1

a) The 10mm x 8mm section of material, which carries the M6 tapped hole for the fuel jet attachment, can be made as follows:

   1. Leave an 8mm wide band of material when turning the outside contour of item 1.
   2. Drill and tap the M6 hole as shown on the drawing.
   3. For the benefit of weight reduction, remove the excess material, to leave the 10mm dimension

b) The machining of the 1.5mm wide x 0.5mm deep shoulders is best carried out after item 15 has been welded up and trimmed parallel along the edges of the major and minor diameters. Also, those diamters can be checked, any adjustments made, and the shoulder dimensions machined to suit. Ideally, Item 15 should fit firmly, after having been sprung into place.

c) A method of locating the 10mm diameter hole required in item 15 so that the fuel jet assembly may be screwed in on the center line. Assemble item 15 onto item 1, maintaining longitudinal alignment of the 5mm hole and the M6 hole in item 1. Open out the 5mm hole in item 15 to 10mm diameter, drawing over if necessary.

Item 2

For easin the machining procedures, mild steel can be used for this part.

Item 3

The service life of this component could be improved by case-hardening. However, in that event, due to distortion, subsequent grinding of the valve seat face may be required.

Item 4

For successful performance, this part must be made of hardened and tempered spring steel sheet as a minimum quality material.

Items 15, 16, 17, 18, 19

For ease of fabrication and better durability, these sheetmetal components are best made from annealed material. Also, for those constructors who do not have access to the required machine tools, the forming may be more easily carried out by hand. Accuracy in the dimensioning and cutting of the blanks for these parts will help to obtain the correct finished sizes after the forming and welding operations have been carried out.

The relevant drawing may be used to mark out each of these components.

TIG is the recommended welding process for all welded joints.

Have fun – play your Digeridoo safely!

Ron Bernhardt.

Digeridoo Model Pulsejet Assembly and Operation Notes

1. When assembling, be sure that the support bars of the reed valve backing plate (item 5) are aligned so that they will support the petals (blades) fo the reed valve (item 4).

2. The valve plate assembly, located by the 2.5 long spiot, is sandwiched between the shoulder of the reinforcement ring (item 2) and the venturi (item 1) when screwed in place. It will be found that a firm attachment is mad with very little screwing force on this fine thread. When assembled, ensure that the reed valve works freely and seals well. A suck and blow by mouth on the tailpipe opening with the plug hole sealed should verify that condition.

3. Suggested spark plugs: NGK CM6, Champion Y86, Champion UY6

4. The required fuel jet setting will vary according to the fuel used and the ambient air conditions. For petrol (gasoline), between 4 & 5 turns open could be tried as an initial setting.

5. Starting procedure:

Help from a responsible person would be beneficial.

a) First check to see that a jet start-up would not cause harm or damage to persons or property in the vicinity. Remember that exhaust from the jet will consist of very hot combustion products.

b) Switch the ignition circuit on. The intermittent high tension supply (automotive type trembler coil or similar arrangement) should now be arcing across the points of the spark plug. It may be possible to hear this taking place.

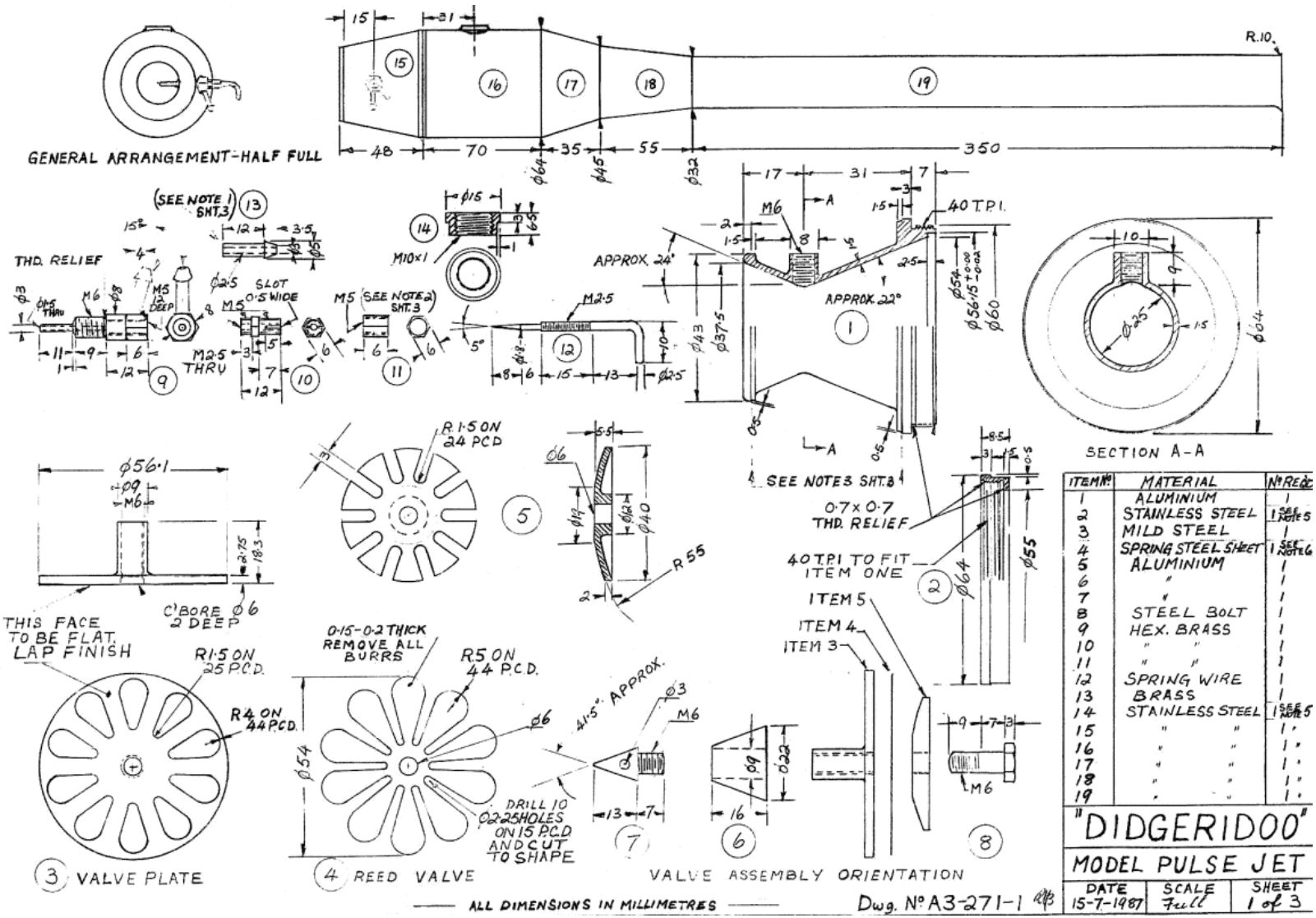
c) Fuel on. Ensure that thefuel supply contains no trapped air (bubbles) between the fuel tank and the jet.

d) Simultaneously (with step c, above), apply a low pressure air stream, by means of a hand or foot operated pump or a compressed air supply through a jet size of abuot 1.5mm (1/16") diameter, across the fuel jet – so that the fuel and air enter the combustion chamber through the ports of the valve plate. It is important to ensure that the air stream breaks the fuel up into fine particles, otherwise with ignition, the fuel may just burn without explosion, causing a mis-start. In the event of continued mis-starts be sure to avoid an accumulation of unburned fuel. In that event, shut down and clean the fuel away before any further attempts at a start are made. When the jet starts, cease the air stream immediately. Experience is the best and only way to learn to start and operate your pulsejet.

6. Prolonged static running may reduce the life of a model pulsejet considerably due to excessively high metal temperatures.

7. **PULSEJETS ARE NOISY. FUELS ARE HAZARDOUS MATERIALS**. Due consideration should be given to all persons and property in the vicinity of operation**. SAFE OPERATION GIVES PLEASURE AND SATISFACTION**.

Ron Bernhardt.

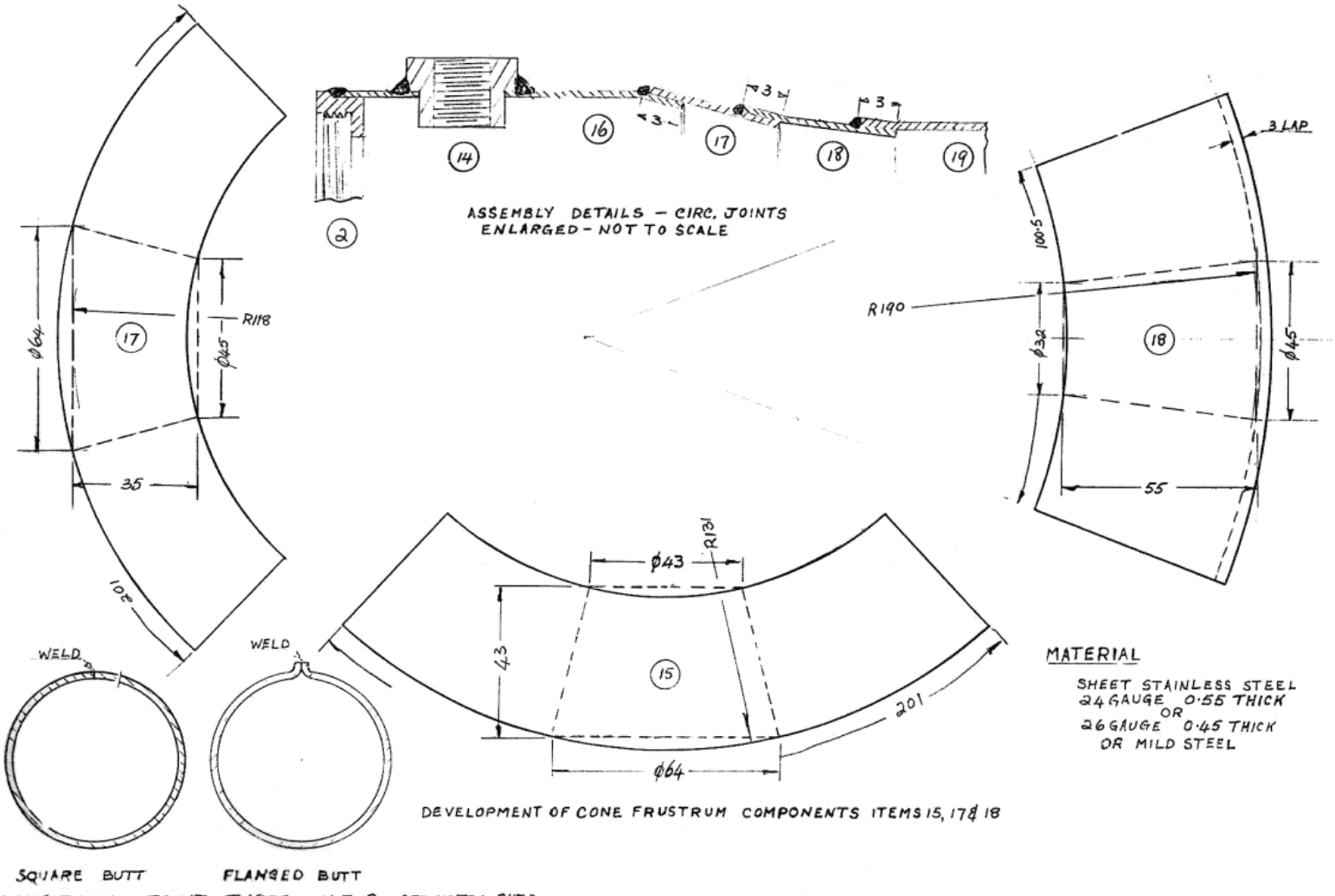


ITEM Nº	MATERIAL	Nº REQ'D
1	ALUMINIUM	1
2	STAINLESS STEEL	1 SEE NOTE 5
3	MILD STEEL	1
4	SPRING STEEL SHEET	1 SEE NOTE 6
5	ALUMINIUM	1
6	"	1
7	"	1
8	STEEL BOLT	1
9	HEX. BRASS	1
10	"	1
11	" "	1
12	SPRING WIRE	1
13	BRASS	1
14	STAINLESS STEEL	1 SEE NOTE 5
15	" "	1 "
16	" "	1 "
17	" "	1 "
18	" "	1 "
19	" "	1 "

"DIDGERIDOO"

MODEL PULSE JET

DATE	SCALE	SHEET
15-7-1987	Full	1 of 3



DATE	SCALE	SHEET
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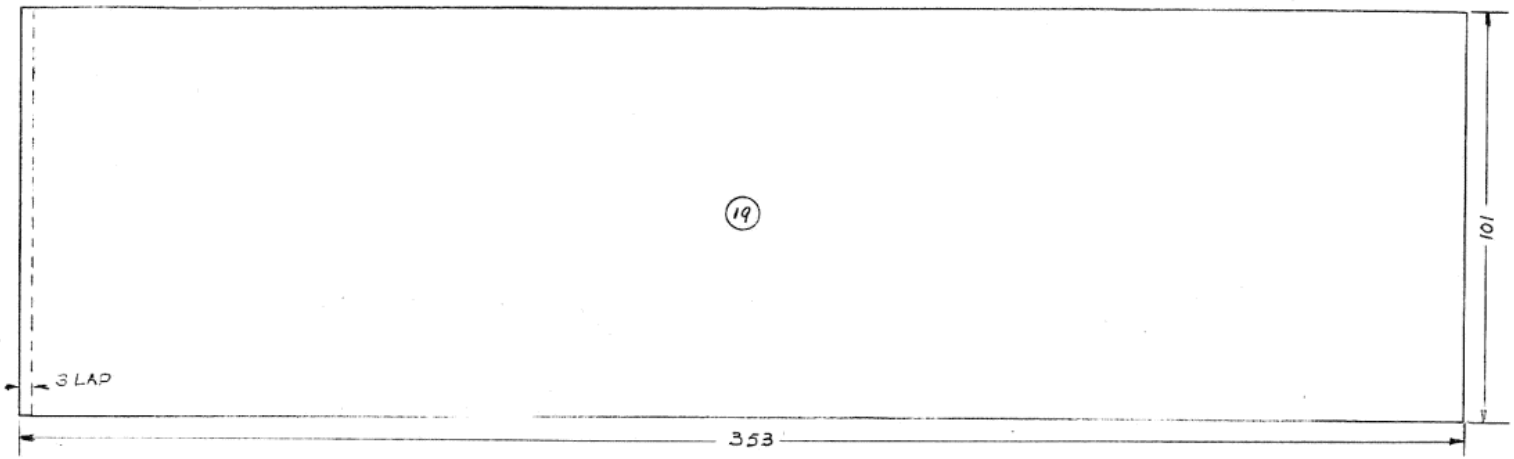

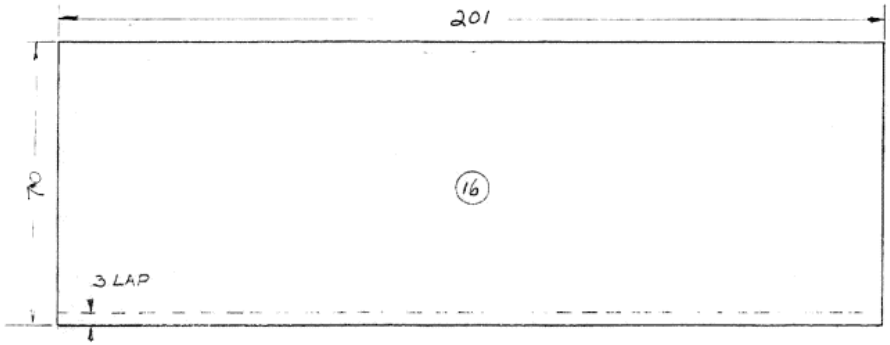

DEVELOPMENT OF CYLINDRICAL COMPONENTS ITEMS 16 & 19

MATERIAL

SHEET STAINLESS STEEL
24 GAUGE 0·55 THICK
OR
26 GAUGE 0·45 THICK
OR MILD STEEL

ALL DIMENSIONS IN MILLIMETRES

CHECK ALL DRAWINGS BEFORE COMMENCING ANY WORK

NOTES

(1) Items 9 & 13 Fuel Jet Body/Fuel Line Tailpiece. Drill a 4mm diameter hole through one side of item 9, insert item 13 in the position illustrated and silver braze in place.

(2) Item 11 Jet Needle Locknut. Do not pass the M5 taper (or intermediate) tap right through, so that the thread in the nut is not quite to depth at one end. This will ensure a locking effect on the jet needle thread when tightened lightly after needle adjustments are made.

(3) Item 1 Venturi. As an alternative appearance finish, the length of venturi indicated between the arrowheads may be lightened by circumfrential or longitudinal fins instead of the contouring and sheetmetal cowl method shown.

(4) Items 15,16,17,18 & 19. A square butt longitudinal joint would be the easiest type to fit up. However if the flanged butt is preferred then an extra material allowance will be required to form the flanges.

(5) Items 2,14,15,16,17,18 & 19. An austenitic grade is recommended for these components. Suggested types are the 302, 303 & 304, 18 - 8 materials. Mild steel can be substituted.

(6) Item 4 Reed Valve. Only one valve is required in the model. However a good investment may be realised in making several valves at the same time.

DATE	SCALE	SHEET
15-7-1987	Full	3