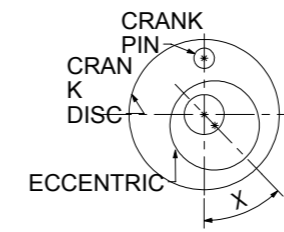
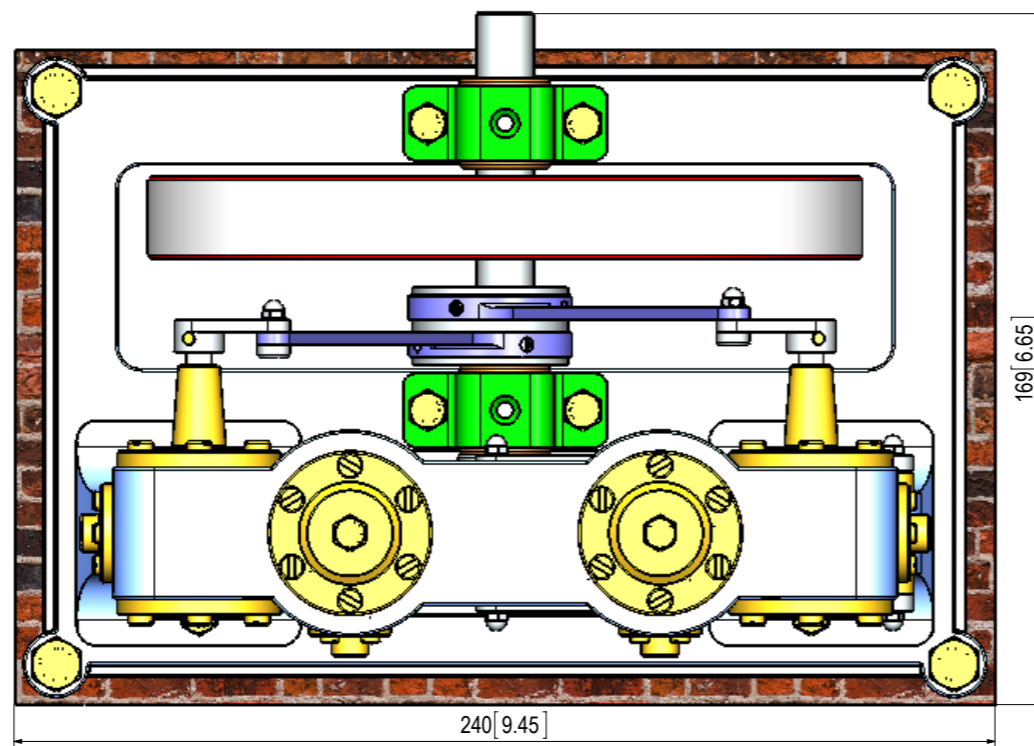
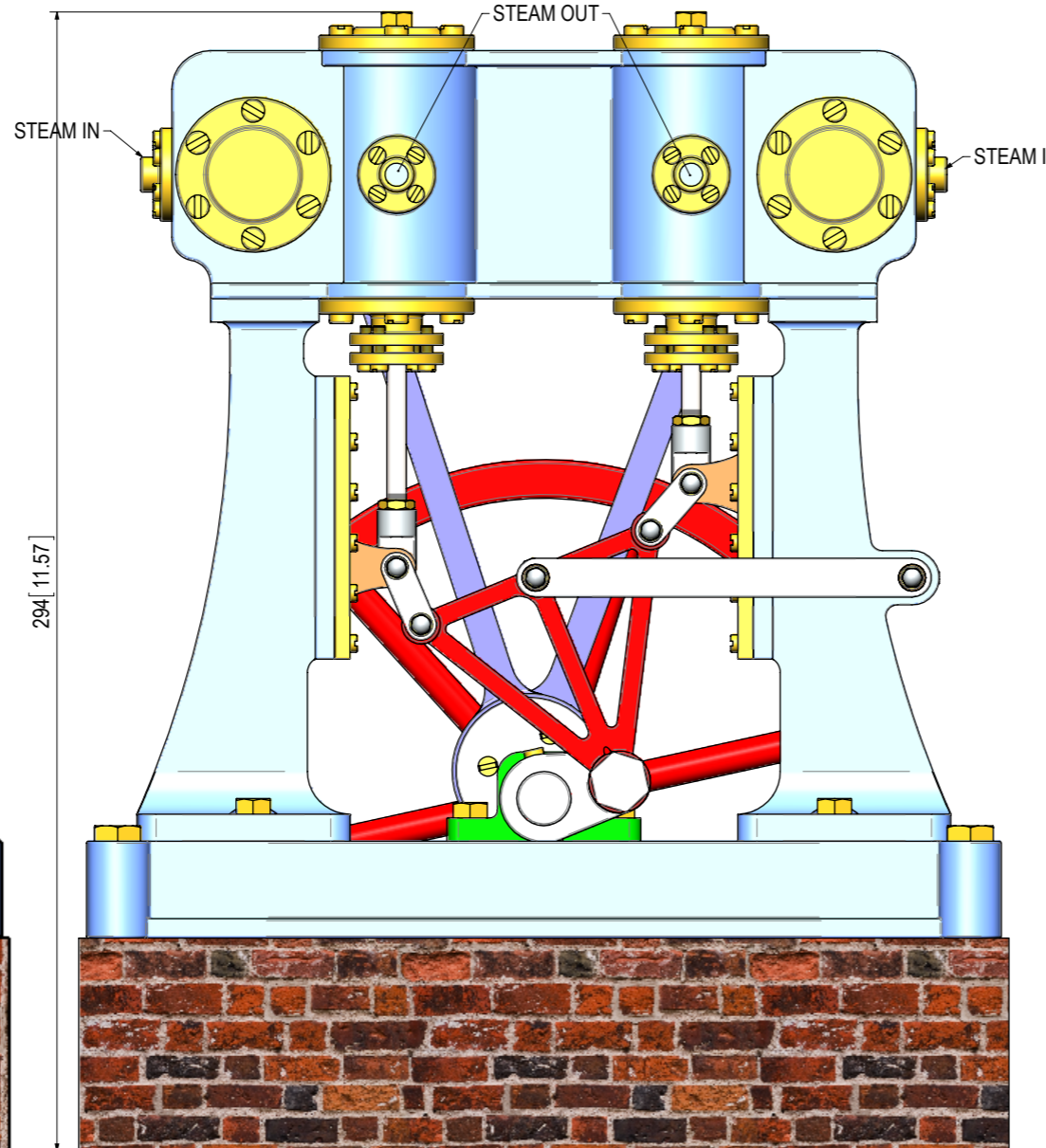
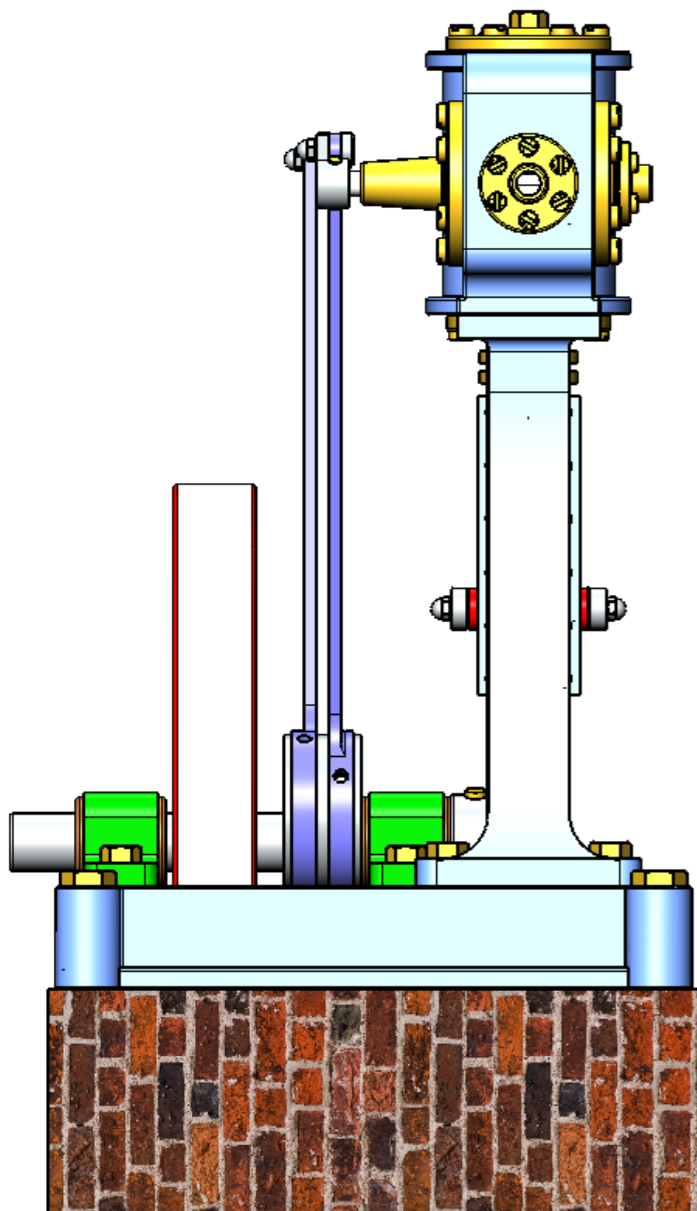
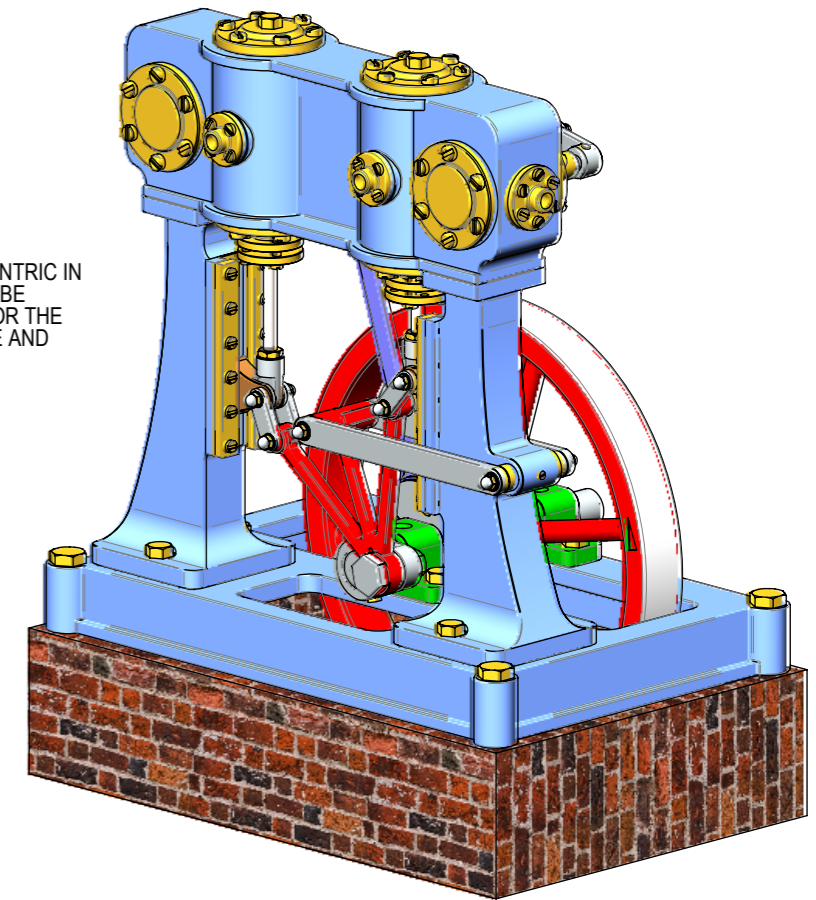


- NOTES:  
 0. ALL DRAWINGS ARE IN METRIC MEASUREMENTS  
 1. ALL ENGINEERING PRACTICES SHALL BE APPLIED WITH REGARDS TO HOLE AND SHAFT TOLERANCES.  
 2. WHERE SCREWS OR BOLTS ARE USED THE CLEARANCE HOLES SHALL BE APPROXIMATELY 5% TO 8% LARGER THAN THE MATCHING TAPPED HOLE.  
 3. PREFERABLY ALL TAPPED HOLES AND MATCHING SCREWS AND/OR BOLTS TO BE METRIC FINE (MF)  
 4. MATERIALS SPECIFIED ON THE DRAWINGS ARE INDICATIVE ONLY. THE BUILDER CAN MAKE HIS/HER OWN MATERIAL CHOICE.  
 5. ALL CONNECTIONS/JOINTS WHICH HAVE STEAM PRESSURE APPLIED TO IT SHALL BE SILVER/HARD SOLDERED.  
 6. COMPRESSION SPRINGS ARE DRAWN IN COMPRESSED STATE (CP), UNCOMPRESSED STATE IS APPROX 40% TO 60% LONGER THEN COMPRESSED STATE.  
 7. WHERE PREFERRED SCREW OR RIVETED CONNECTIONS CAN BE OMITTED AND PARTS CAN BE BONDED TOGETHER BY USING EITHER HIGH STRENGTH GLUE, EPOXY RESIN, OR SOLDER.  
 8. PARTS WHICH ARE DIRECTLY EXPOSED TO STEAM AND/OR WATER SHOULD BE CONSTRUCTED USING NON-FERROUS OR NON CORROSIVE MATERIAL SUCH AS BRASS, BRONZE, GUNMETAL, STAINLESS STEEL, COPPER OR MONEL.  
 9. THE ORDER IN WHICH THE PARTS/COMPONENTS ARE MANUFACTURED AND THE MODEL IS ASSEMBLED IS ENTIRELY LEFT TO THE BUILDER/MODEL MAKER.  
 10. A COLOUR SCHEME FOR THIS PROJECT IS ENTIRELY LEFT UP TO THE MODEL MAKER.  
 11. THE MANNER IN WHICH THE PARTS/COMPONENTS ARE MANUFACTURED IS ENTIRELY LEFT UP TO THE BUILDER.  
 12. USE LOCTITE, ON SCREW OR PRESS FIT CONNECTIONS OR SURFACES, WERE DEEMED NECESSARY TO PREVENT PARTS FROM LOOSENING.  
 13. WASHERS AND/OR SPRINGWASHERS SHALL BE USED WHERE DEEMED NECESSARY.  
 XX. ERRORS AND/OR OMISSIONS MAY OCCUR IN THE DRAWINGS, DO NOT HESITATE TO CONTACT ME SO THAT THE ERRORS/OMISSIONS CAN BE RECTIFIED.



THE OFF SET ANGLE OF THE ECCENTRIC IN RELATION TO THE CRANK AXIS TO BE EXPERIMENTALLY DETERMINED FOR THE SMOOTH RUNNING OF THE ENGINE AND SATISFACTION OF THE BUILDER



- OTHER ABBREVIATIONS  
 DP = DEEP  
 DAA= DRILL AFTER ASSEMBLY  
 D&TAA= DRILL AND TAP AFTER ASSEMBLY  
 CF = CLOSE FIT (SIZE FOR SIZE)  
 PF = PRESS FIT  
 PFAA= PRESS FIT AFTER ASSEMBLY  
 PCD = PITCH CIRCLE DIAMETER  
 RM = REAM  
 HEX = HEXACON, 6SIDED  
 CP = COMPRESSED  
 KNL = KNURLED  
 CSK = COUNTERSINK  
 PL = PLACES  
 DWL= DOWEL  
 SPF= SPOTFACE  
 (T)HESOP=(TAPPED)HOLES EQUALLY SPACED ON PCD  
 (T)HESOC=(TAPPED)HOLES EQUALLY SPACED ON CIRCUMFERENCE  
 [SA-xxx]= SUB ASSEMBLY-xxx

- MATERIAL ABBREVIATIONS:  
 ALU = ALUMINIUM  
 HALU= HARD ALUMINIUM  
 BRS = BRASS  
 BRZ = BRONZE OR GUNMETAL (BRZ/GM)  
 CI = CAST IRON  
 CU = COPPER  
 GRA = GRAPHITE  
 MS = MILD STEEL/BRIGHT MILD STEEL  
 SS = SILVER STEEL OR STAINLESS STEEL  
 SPS = SPRING STEEL  
 PEEK= POLYETHER ETHER KETONE  
 SYN = SYNTHETIC MATERIAL SUCH AS VETON, NYLON, TEFLON OR RUBBER  
 IN GENERAL SYNTHETIC MATERIALS SOULD BE ABLE TO WITHSTAND THE HEAT AND PRESSURE(S) APPLIED TO THEM.  
 nnn/nnn MEANS THAT EITHER MATERIAL CAN BE USED

QTY.	PART NUMBER
1	MUSGRAVE-1-01-BASE PLATE
1	MUSGRAVE-1-02-LH-PILLAR
1	MUSGRAVE-1-03-RH-PILLAR
2	MUSGRAVE-1-04-CRANKSHAFT BEARING
1	MUSGRAVE-1-05-CYLINDER BLOCK
2	MUSGRAVE-1-06-CYLINDER TOP COVER
2	MUSGRAVE-1-07-CYLINDER BOTTOM COVER
2	MUSGRAVE-1-08-STEAM INLET FLANGE
2	MUSGRAVE-1-09-STEAM OUTLET FLANGE
2	MUSGRAVE-1-10-VALVE CHAMBER FRONT COVER
2	MUSGRAVE-1-11-VALVE CHAMBER REAR COVER
2	MUSGRAVE-1-12-LINKTYPE-2 SPACER
1	MUSGRAVE-1-13-BRICK BASE
1	MUSGRAVE-2-01-CRANKSHAFT+FLYWHEEL
2	MUSGRAVE-2-02-PISTON+ROD
2	MUSGRAVE-2-03-CROSSHEAD
1	MUSGRAVE-2-04-CON-ROD TRIANGLE
4	MUSGRAVE-2-05-LINK PIVOT SHAFT-1
2	MUSGRAVE-2-06-LINK PIVOT SHAFT-2
4	MUSGRAVE-2-07-LINK TYPE-1
2	MUSGRAVE-2-08-LINK TYPE-2
2	MUSGRAVE-2-09-ROCKING VAVLE
1	MUSGRAVE-2-10-ECCENTRIC SHEAVE
2	MUSGRAVE-2-11-ECCENTRIC STRAP
2	MUSGRAVE-2-12-ECCENTRIC TOP PIN
14	MUSGRAVE-M3 DOME NUT
2	MUSGRAVE-M3 NUT-BRASS
14	MUSGRAVE-M3 WASHER-BRASS
1	MUSGRAVE-M3x6.5 GRUB SCREW-BRASS
4	MUSGRAVE-M3x8 C-SINK SCREW-BRASS
1	MUSGRAVE-M3x8 GRUB SCREW-BRASS
24	MUSGRAVE-M3x8 PAN HEAD SCREW-BRASS
28	MUSGRAVE-M3x10 PAN HEAD SCREW-BRASS
2	MUSGRAVE-M3x16 GRUB SCREW
48	MUSGRAVE-M4x12 PAN HEAD SCREW-BRASS
2	MUSGRAVE-M5 NUT-BRASS
1	MUSGRAVE-M6 NUT
2	MUSGRAVE-M6x7 HEX BOLT-BRASS
8	MUSGRAVE-M6x14 HEX BOLT-BRASS
4	MUSGRAVE-M8x35 HEX BOLT-BRASS

NOTES: THIS DESIGN IS BASED ON A SINGLE DRAWING WHICH WAS GIVEN TO ME. THE ORIGINAL DRAWING WAS SIGNED AND DATED BY Mr. LOTHAR MATRIAN , DORTMUND, GERMANY.

TITLE  
**A MODEL OF A "MUSGRAVE" TYPE STEAM ENGINE**

DRAWING CONTENTS  
**GENERAL ARRANGEMENT, ISOMETRIC VIEW, NOTES AND BILL OF MATERIALS**

PROJECT No 09C-33-00  
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PROJECTION  
**JDWDS** MODEL SCALE: 1:1  
 DWG SCALE: 1:1 @A3 OR AS SHOWN  
 DATE NOVEMBER 2018 Copyright © J.A.M. DE WAAL PAPA KURA NZ  
 SHEET: 01 OF 04 **A3** No: 09C-33-00-SHT01

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