

# **THE CETA-RAM BLOCK PRESS**

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## **1. INTRODUCTION**

The CETA-RAM is a manually operated block press, developed by the author just after the February 1976 Guatemalan Earthquake, specifically for the production of hollow soil-cement building blocks. The hollow blocks are intended for use in reinforced masonry for low cost earthquake resistant housing.

The CETA-RAM is a modified version of the well known CINVA-RAM.

The name CETA-RAM honors the Centro Experimental de Tecnología Apropriada (CETA), where it was developed, and the Chilean engineer Raúl Ramírez, creator of the CINVA-RAM.

## **2. DESCRIPTION**

The CETA-RAM is a compact and lightweight machine, mechanically simple, low in cost, and easily operated and maintained. Nevertheless, it is capable of molding at high pressure, dense and neatly finished blocks of high structural quality, at the rate of 300 to 500 units per eight hour shift, when operated by two persons.

Built entirely of steel, it is composed of three main assemblies (see drawings):

- MOULD (1) with COVER PLATE (2)
- PISTON (3)
- YOKE (4) and LEVER DEVICE (5)

The Cover Plate opens and closes the Mold, by pivoting 90 degrees in a horizontal plane. The Piston has two bushings (N) engaging with a sliding fit the two vertical columns (F) fixed to the base of the Mold, and by which means the Piston is vertically guided in its stroke. These cylindrical columns

also function as inserts to form the holes in the blocks. The Lever actuates the Piston to compress the fresh soil-cement mixture inside the Mold, and also to eject the block thus formed. One important feature of the CETA-RAM is that the Piston guiding mechanism never needs adjustment.

### 3. OPERATION

The making of each block comprises three basic operations:

- Loading the soil-cement mixture into the Mold.
- Actuating the Lever to compress the mixture.
- Actuating the Lever in the opposite direction to eject the finished block.

The block is then manually removed and laid to set and cure moist in a shaded place, for a minimum of seven days.

To ease the handling of the freshly molded blocks, two sheet steel pallets are used: each block is molded with one pallet underneath; after the block is ejected, the other pallet is placed on top of it. The block is then hand carried between both pallets, and carefully laid on its side on the ground, thereby freeing the pallets for immediate reutilization.

Special pallets have been developed, that permit the making of two half blocks per molding cycle.

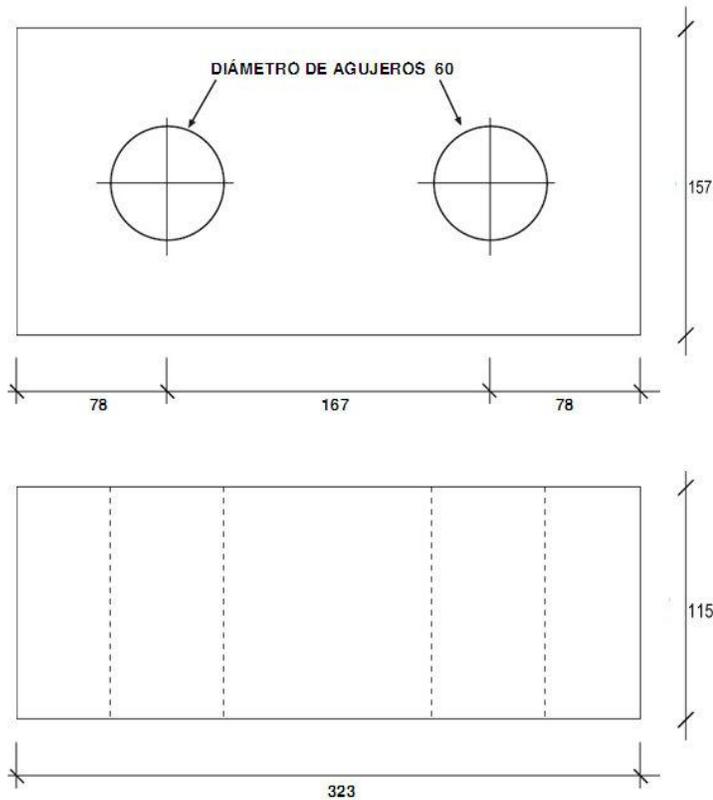
### 4. THE CETA RAM BLOCK

The dimensions of the CETA-RAM block are 32.3 x 15.7 x 11.5 cm. Two 6 cm diameter holes run through its full thickness. The holes simplify the placement of vertical reinforcement in earthquake resistant wall constructions: the steel reinforcing rods running through the holes in the laid blocks, at the required spacing, are set in cement mortar or grout. The length of three blocks, included the respective joints, add exactly one meter. This comes out to be convenient in the planning and execution of low cost housing projects, as it allows a modular coordination on the basis of 50 and 100 centimeters, in both architectural and structural aspects. Twenty four blocks lay up one square meter of wall.

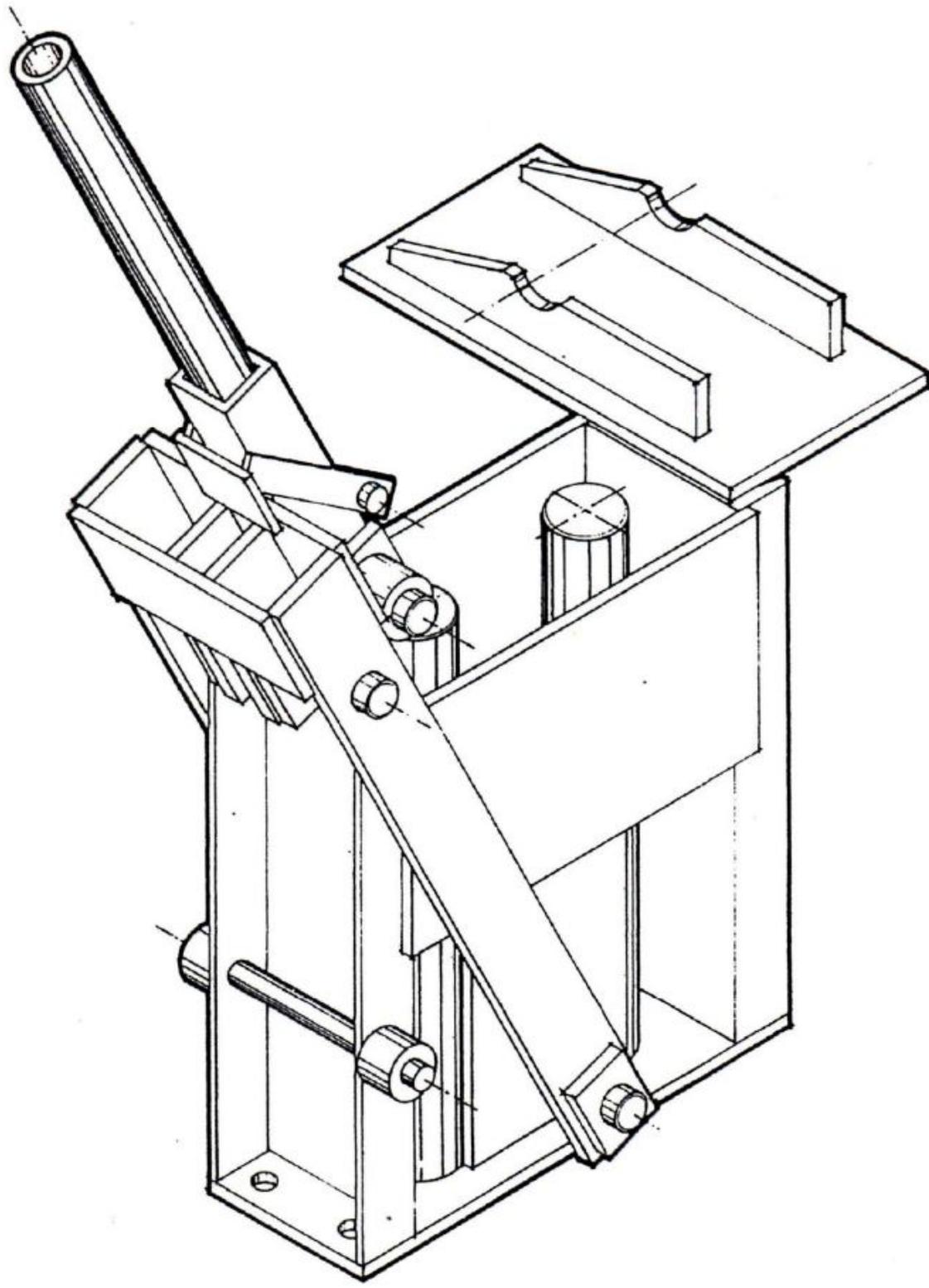
### 5. EXPERIENCES WITH THE CETA RAM

The CETA-RAM design has already been fully field proven. To date, CETA has built more than 50 units, used in various rural habitational projects throughout the country and abroad.. Some of these machines have produced more than 60,000 blocks apiece, without operational problems and without undue wear. It would appear that with proper care and maintenance, the life span of CETA-RAM, expressed in terms of production, could conservatively be estimated at 100,000 blocks.

Pumitic sandy and silty volcanic soils, very light in weight, abound in our country. Blocks fabricated with mixtures of these soils with cement, in a volumetric proportion of 12 to 1, consistently attain compressive strength values above 35 kg/sq. em (500 psi).

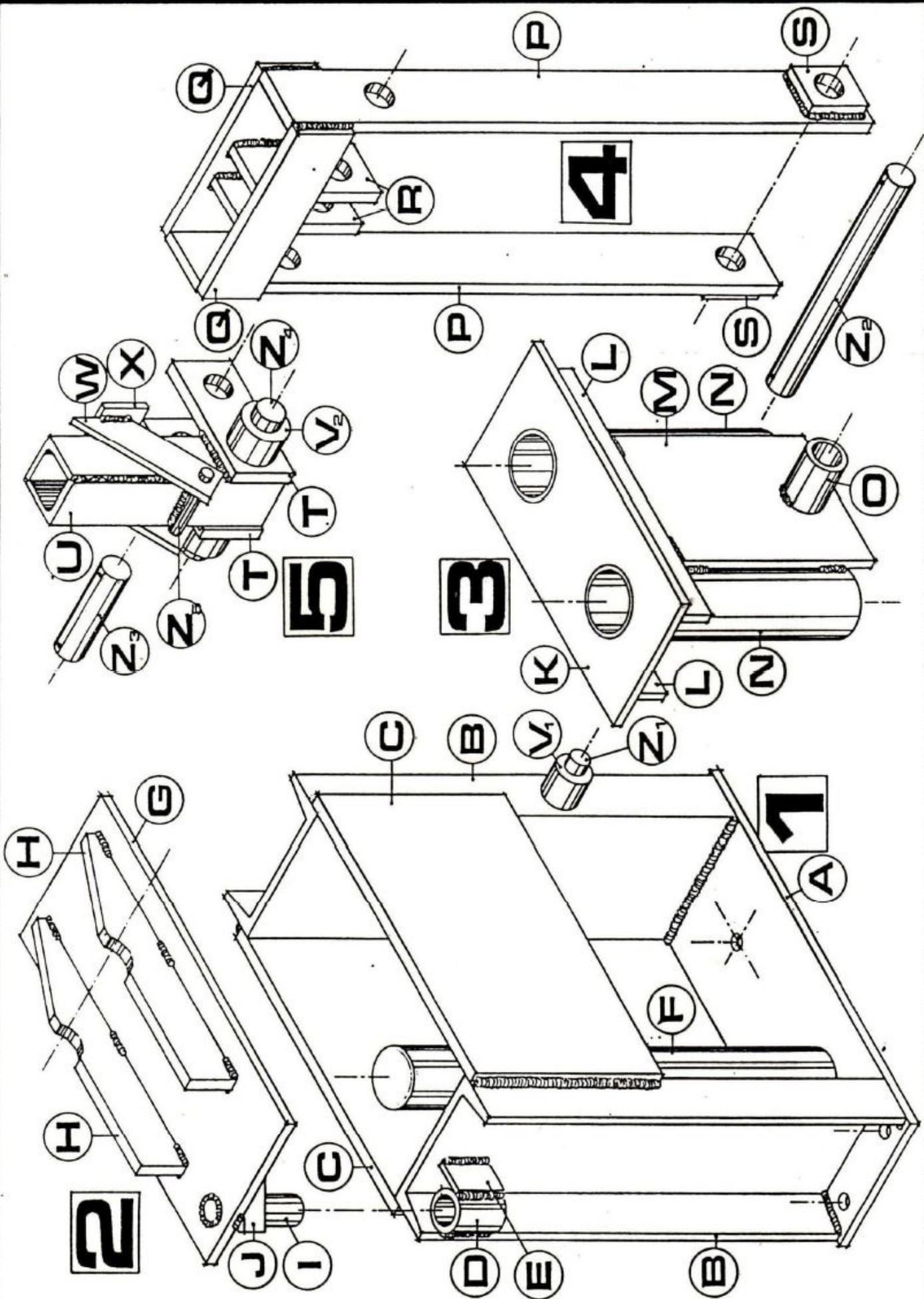


**CETA RAM BLOCK**



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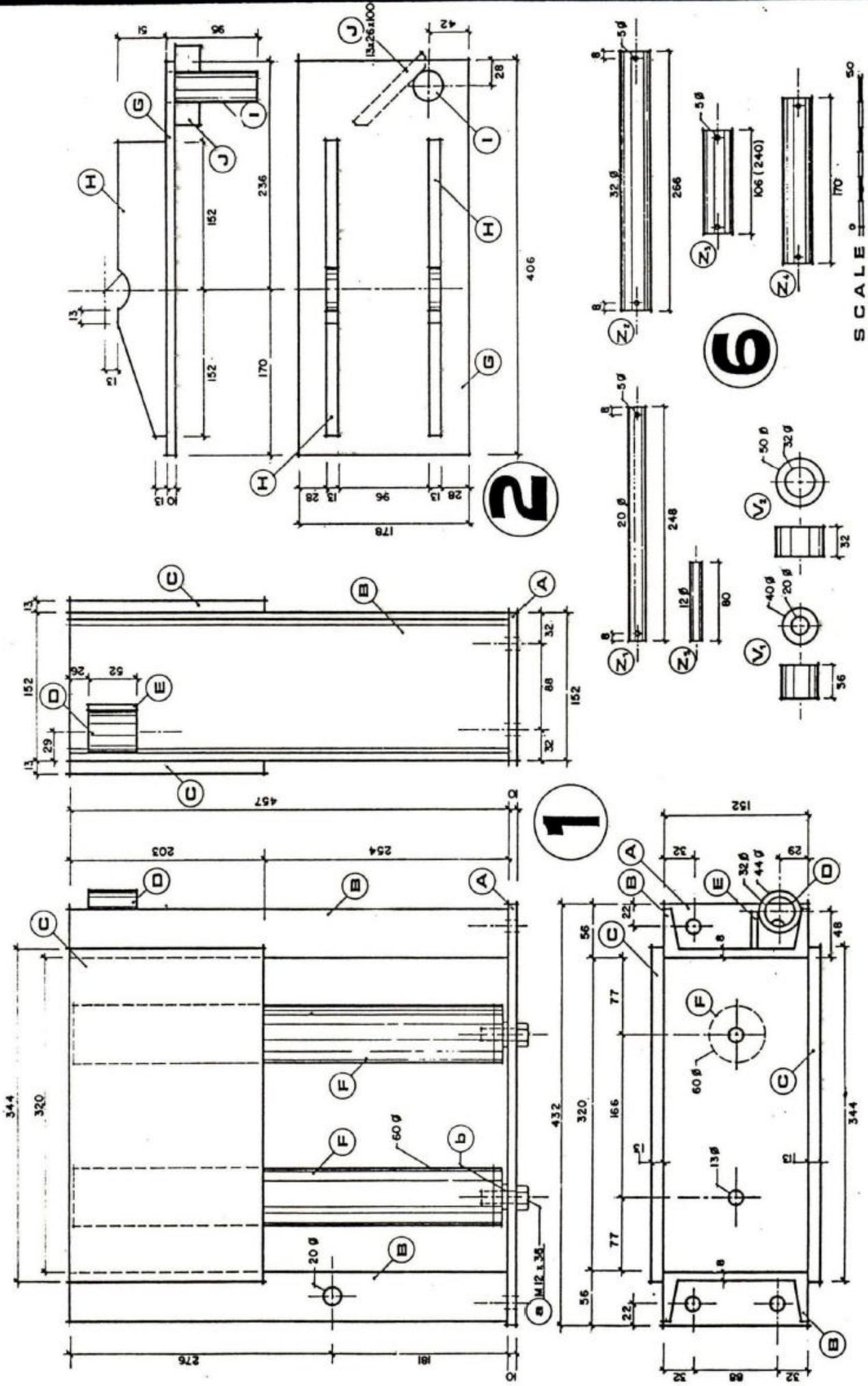
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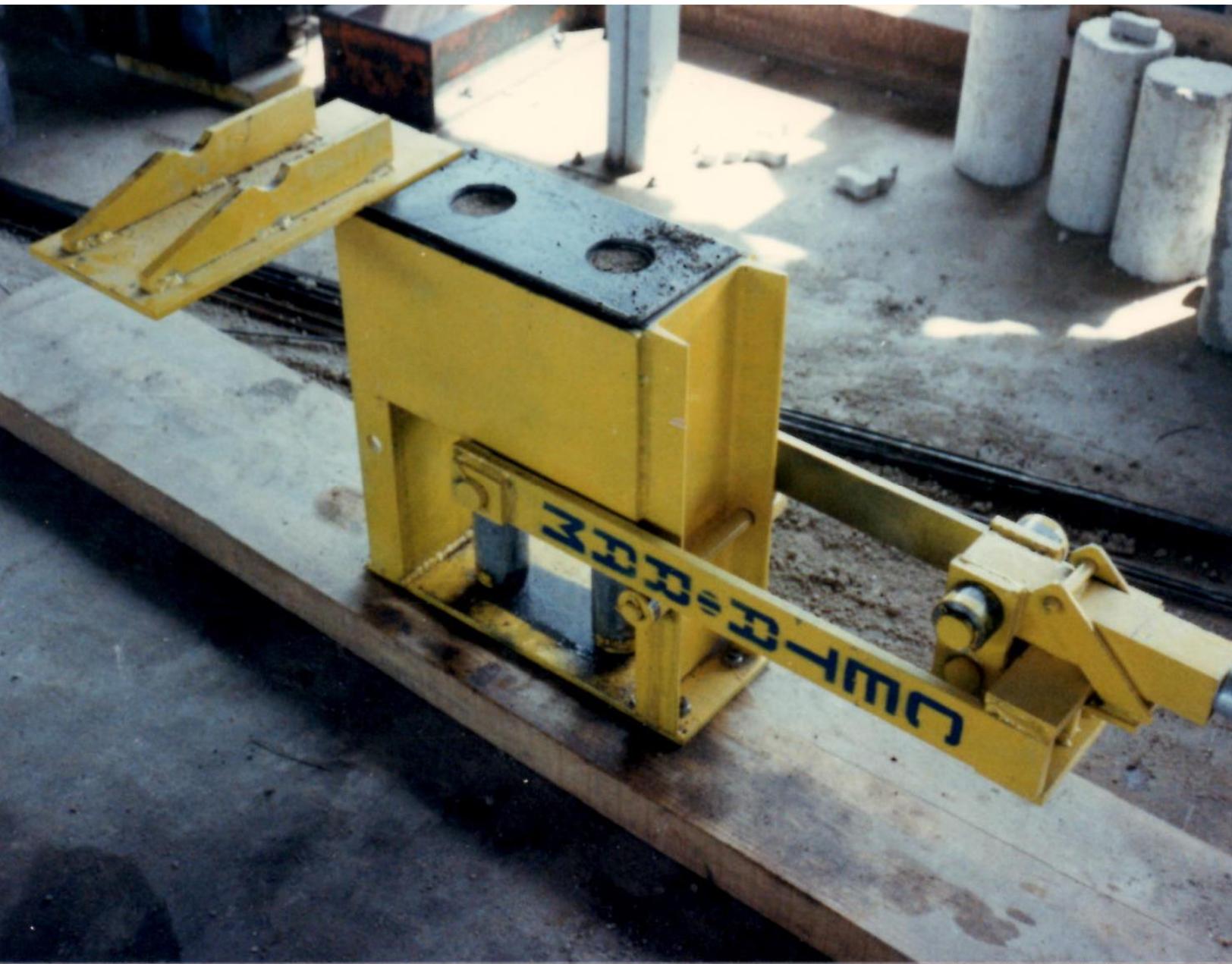
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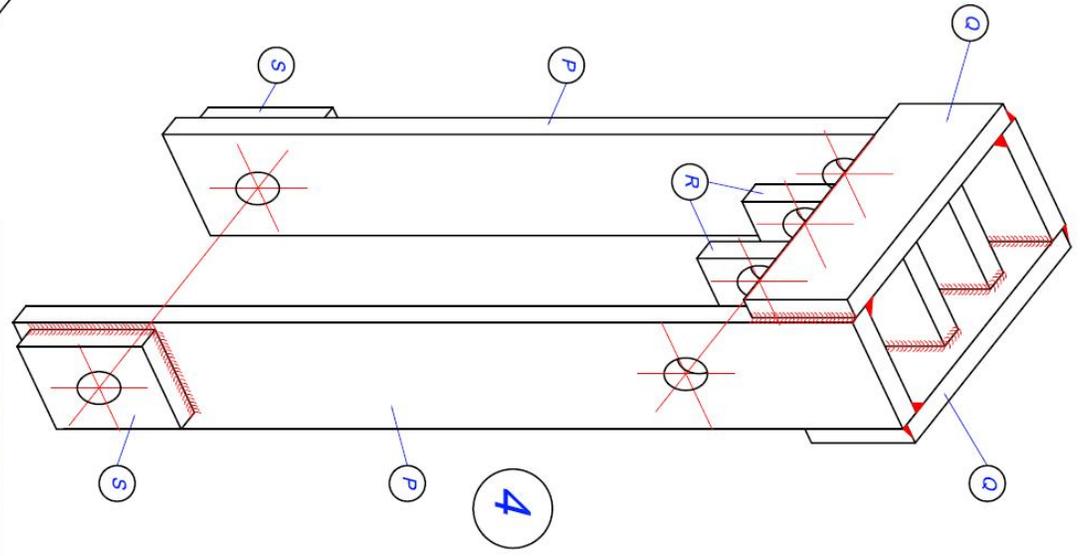
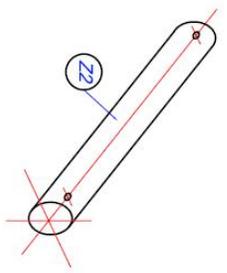
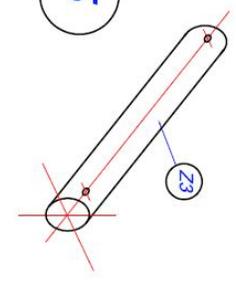
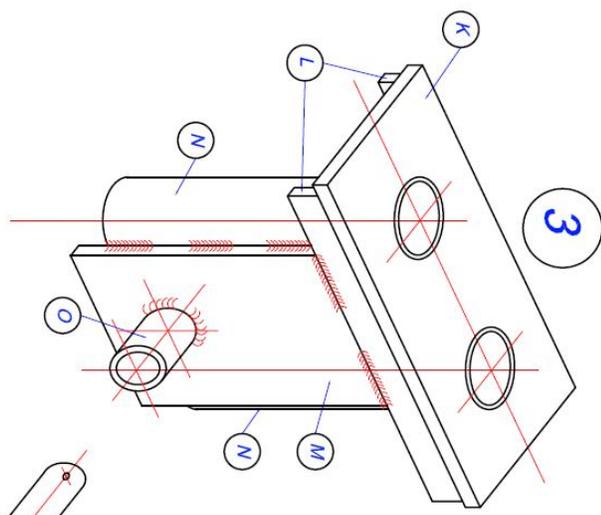
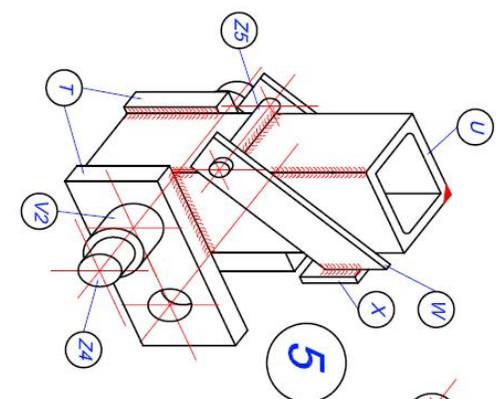
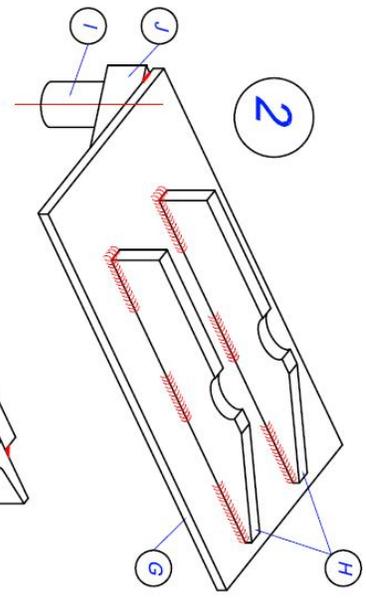
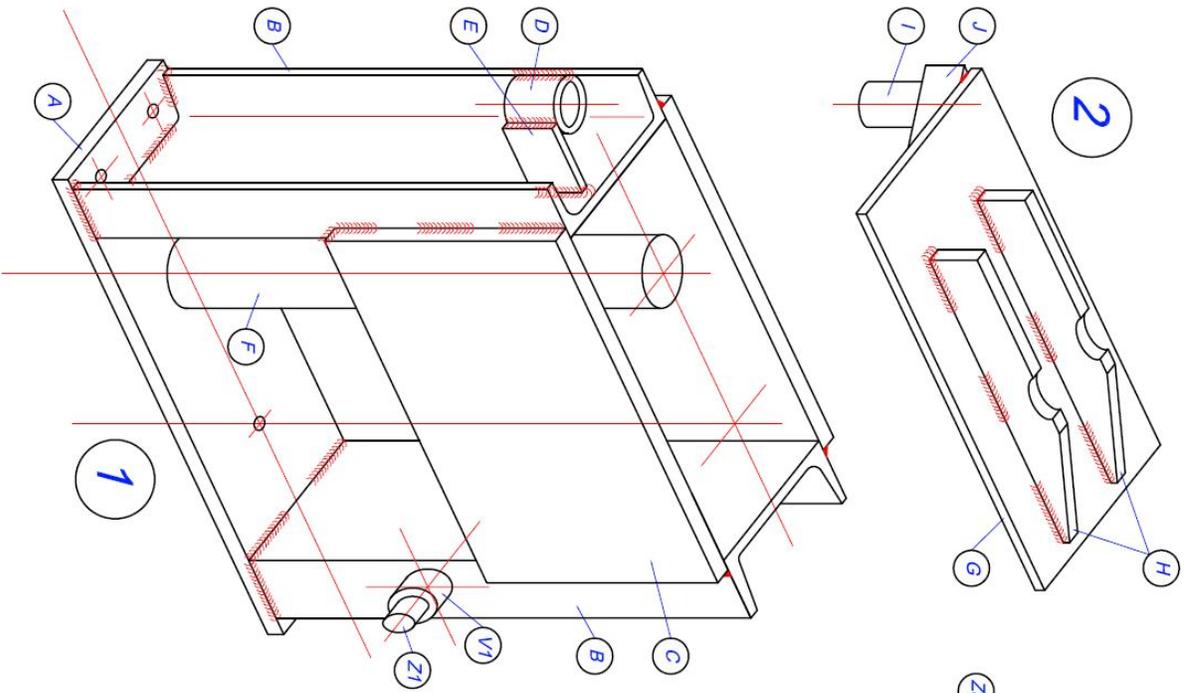




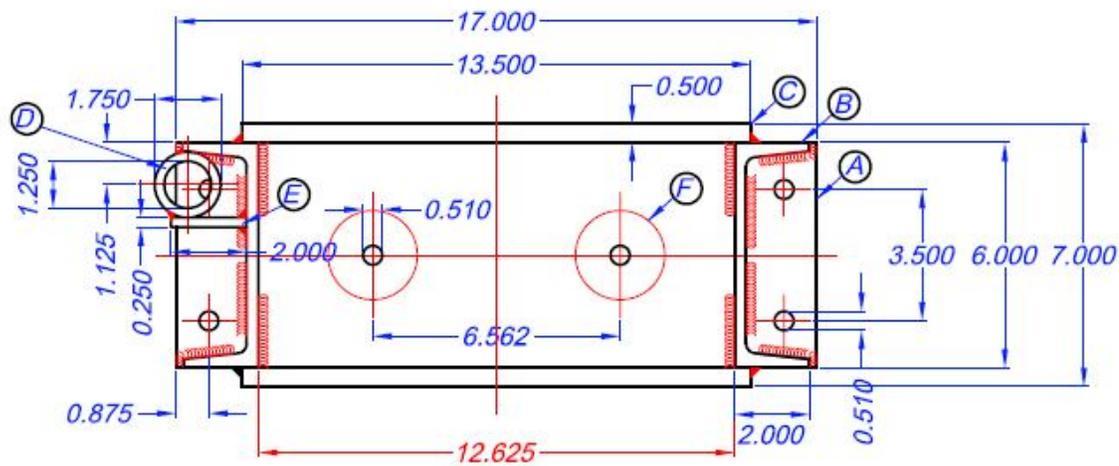
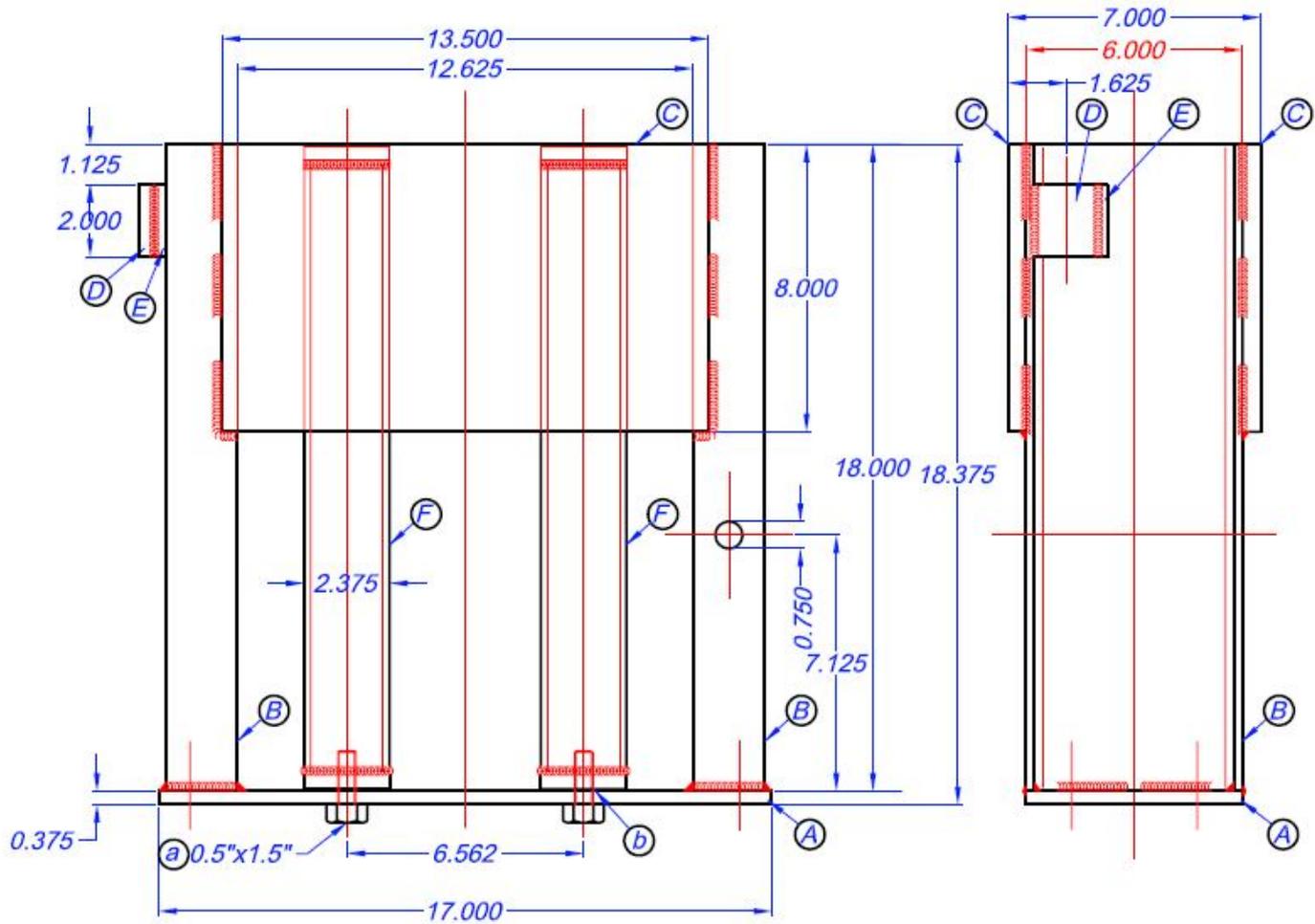




Following, drawings of the CETA RAM with dimensions in inches

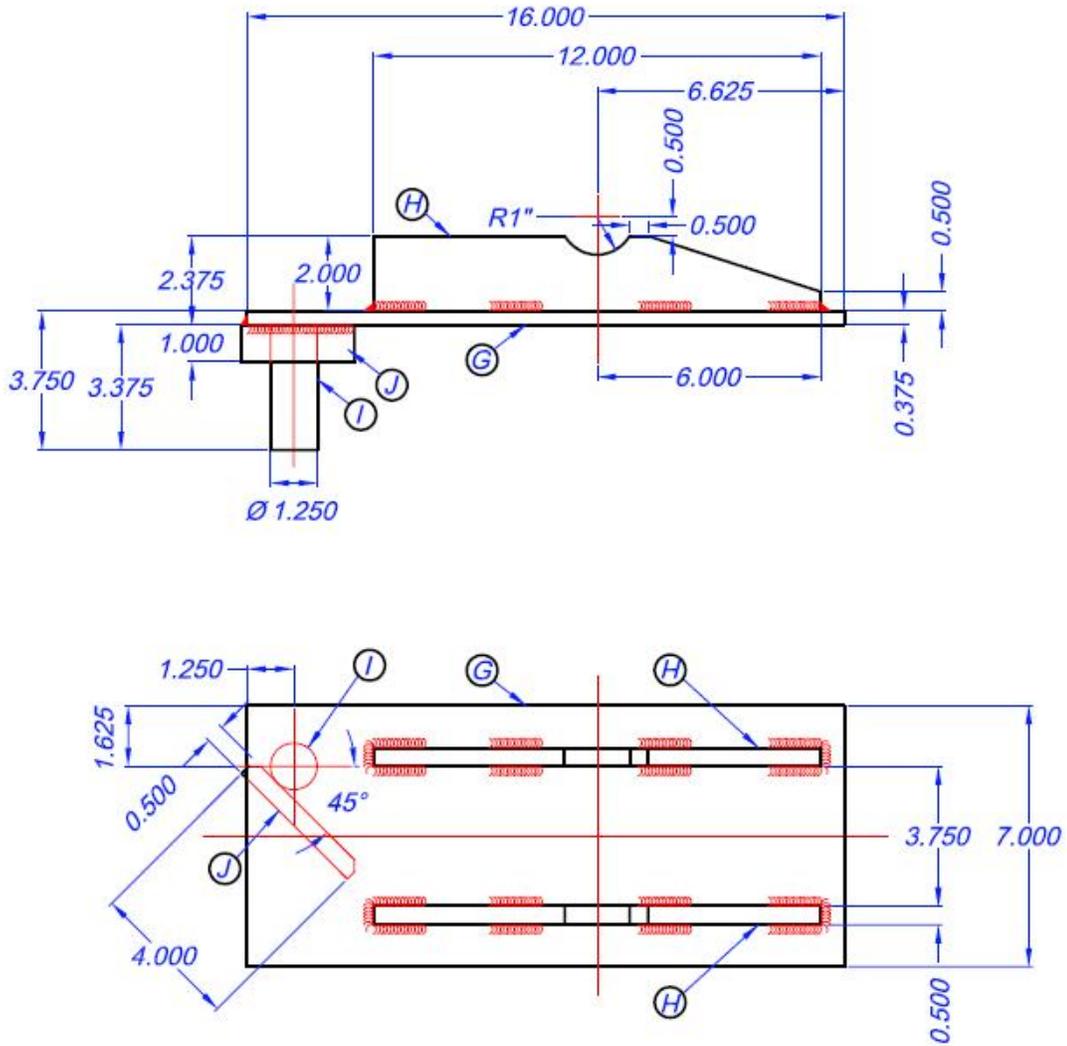


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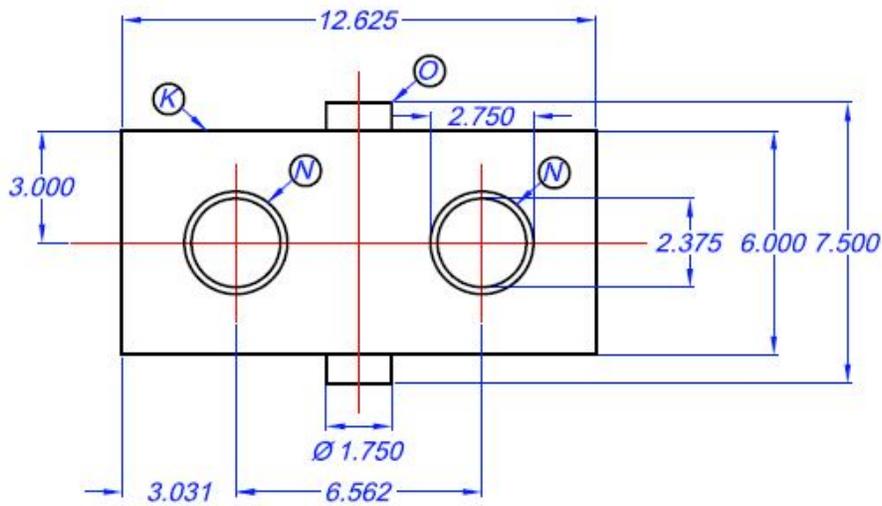
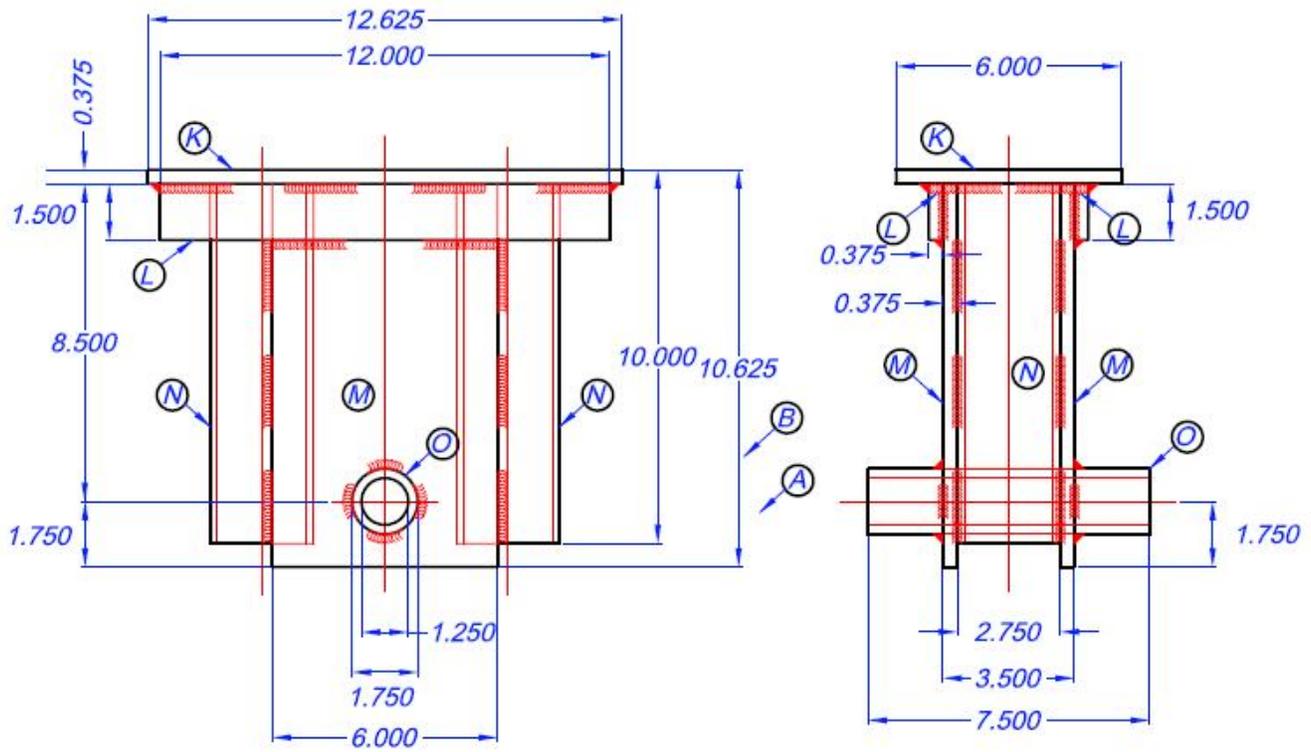
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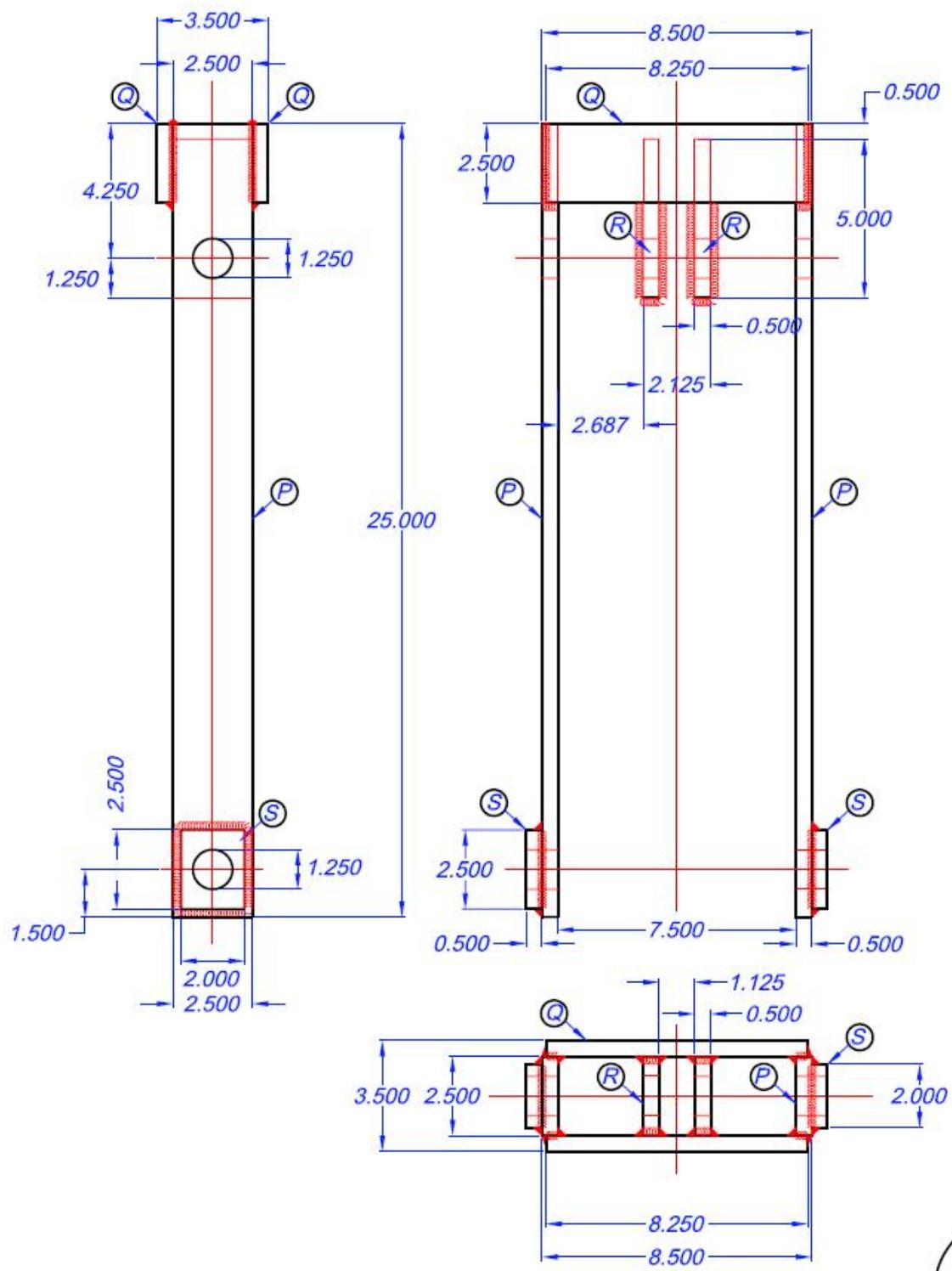
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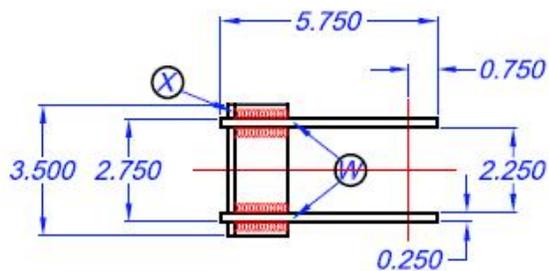
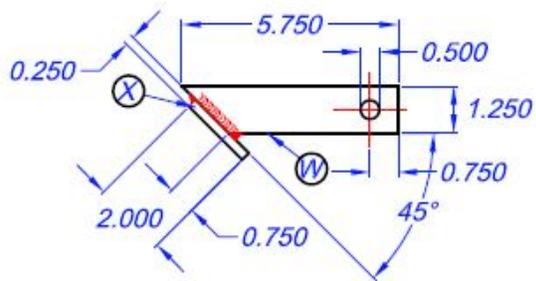
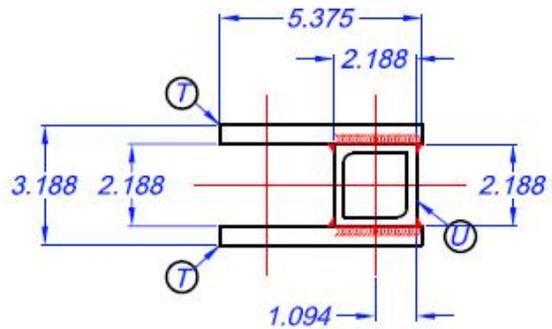
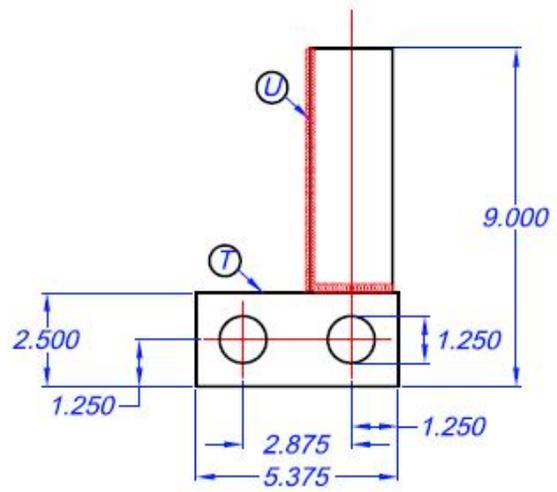
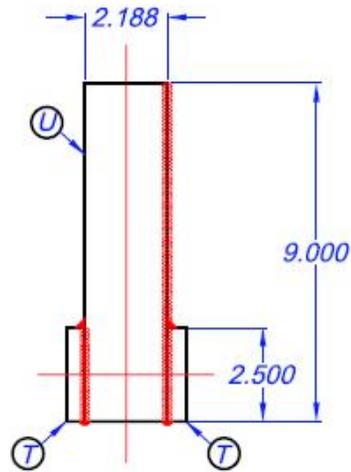
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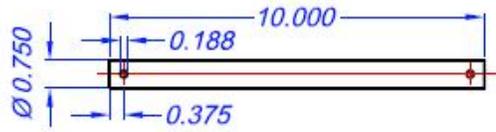
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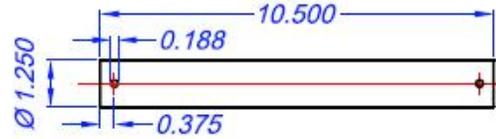
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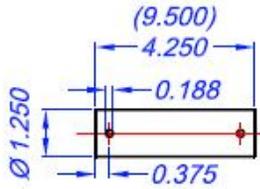
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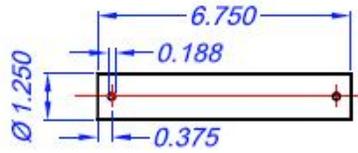
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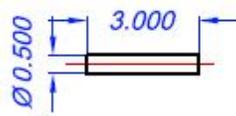
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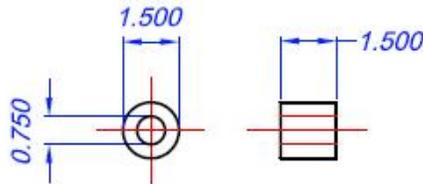
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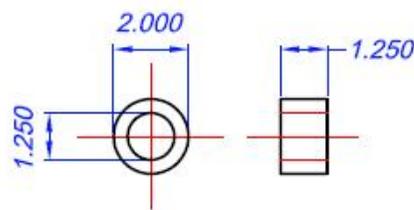
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