Design and Construction of A Hydraulic Log Splitter

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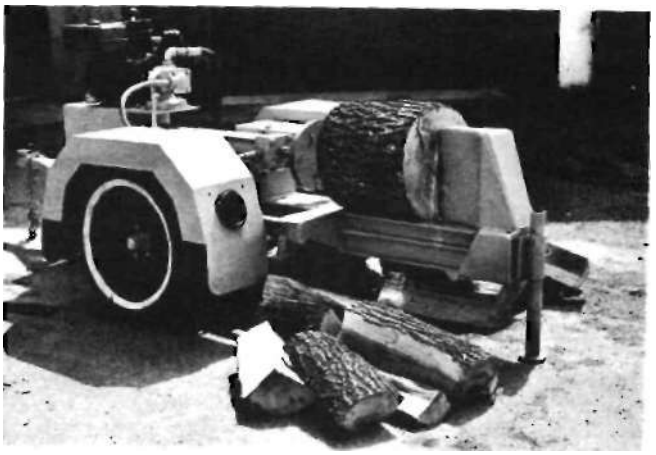

Most of the materials were obtained at minimal or no cost (Table 1). Tires, wheels and spindles (56) were salvaged from a wrecked 1970 Dodge automobile. Two leaf springs (1) were salvaged from the front axle of a pickup truck. Two I-beams (6) were salvaged cutoffs left over from a construction site. The hydraulic ram (22) was acquired as salvage from a local industry. The used hydraulic control valve (35) and pump (34) also were purchased as salvage. A new filter (38) and hoses (39,40) were purchases. The small gasoline engine (36) was removed from outdated gardening equipment.

Main I-beam Carriage Construction

Two *6'* I-beams (6) were used to construct the combination main oil reservoir and reinforcement beam, upon which the logs are to be split. The use of the two I-beams welded together provided the structural strength and additional oil storage capacity in the unit.

Axle and Spring Construction

The automobile spindles were welded to 2" diameter double strength pipe (2). The wheel rims were aligned by placing them in a 10" structural channel, thus automatically aligning themselves. The spindles then were tack welded to the 2" diameter pipe.

The springs (I) were centrally located and pre-drilled plates (4) were horizontally welded to the *2"* diameter pipe (2). This provided a place to mount the leaf springs.

Axle to Main Beam Construction

Mounting the main beam to the axle's springs was accomplished by fabrication of mounting brackets. Plates (7, 8) were welded together and welded to the main beam. The mounting brackets attached to the end of the leaf springs were trimmed with an oxy-acetylene cutting torch and welded to the mounting brackets.

Fender Mounting and Construction

The fenders were constructed of 16 gauge material (23-28). Metal grilled tail light guards were fabricated to prevent accidental breakage of the tail lights.

Ram to Main Beam Mounting

The large hydraulic ram was mounted on top of a fabricated box welded to the top of the main beam. This was done to mount the cylinder higher, thus pushing centrally on an average 12" diameter log.

Engine and Pump Mounting

Additional oil reservoir was achieved by fabricating an adjoining box (9-12) to the main beam reservoir. The height allowed the pump to be mounted over the hydraulic ram, thus keeping the log splitter as short as possible.

The hitch section (48) was fabricated from strip stock (13, 14) to form an angle iron V to which the 1%" ball hitch was welded. Safety chains were also added. Special hooks were fabricated from a high grade steel bolt and then welded with E-7018 to the ends of the chain.

Splitting Wedge Fabrication

The splitting wedge was fabricated from *W* plate. The curvature on the frontal surfaces was produced by using a large hydraulic brake, and the additional plates were oxy-acetylene cut to complete the wedge.

The splitting wedge is moveable and removable by removing the bolts that pin it in position. The leading edge of the splitting wedge is built up by overlapping beads of E-308-16 stainless steel to form a point, then ground to the desired shape. A class demonstration then was given on Metal Spraying. In the demonstration, carbide particles were introduced in a molten nickel matrix which was then sprayed on the leading edge. The end product was a splitting wedge with a strong durable cutting edge.

The pushing platten (61) was oxy-acetylene cut from 1" stock and holes drilled and tapped to accept hardened alien cap screws which were ground to a poini. This will prevent the wood from shifting off this platten. The idea of having guides for this platten to follow was added after the log splitter was used because excess flexing of the hydraulic ram was noticed. The guides (32) prevented the flexing of the ram, and also provided a cradle for the logs.

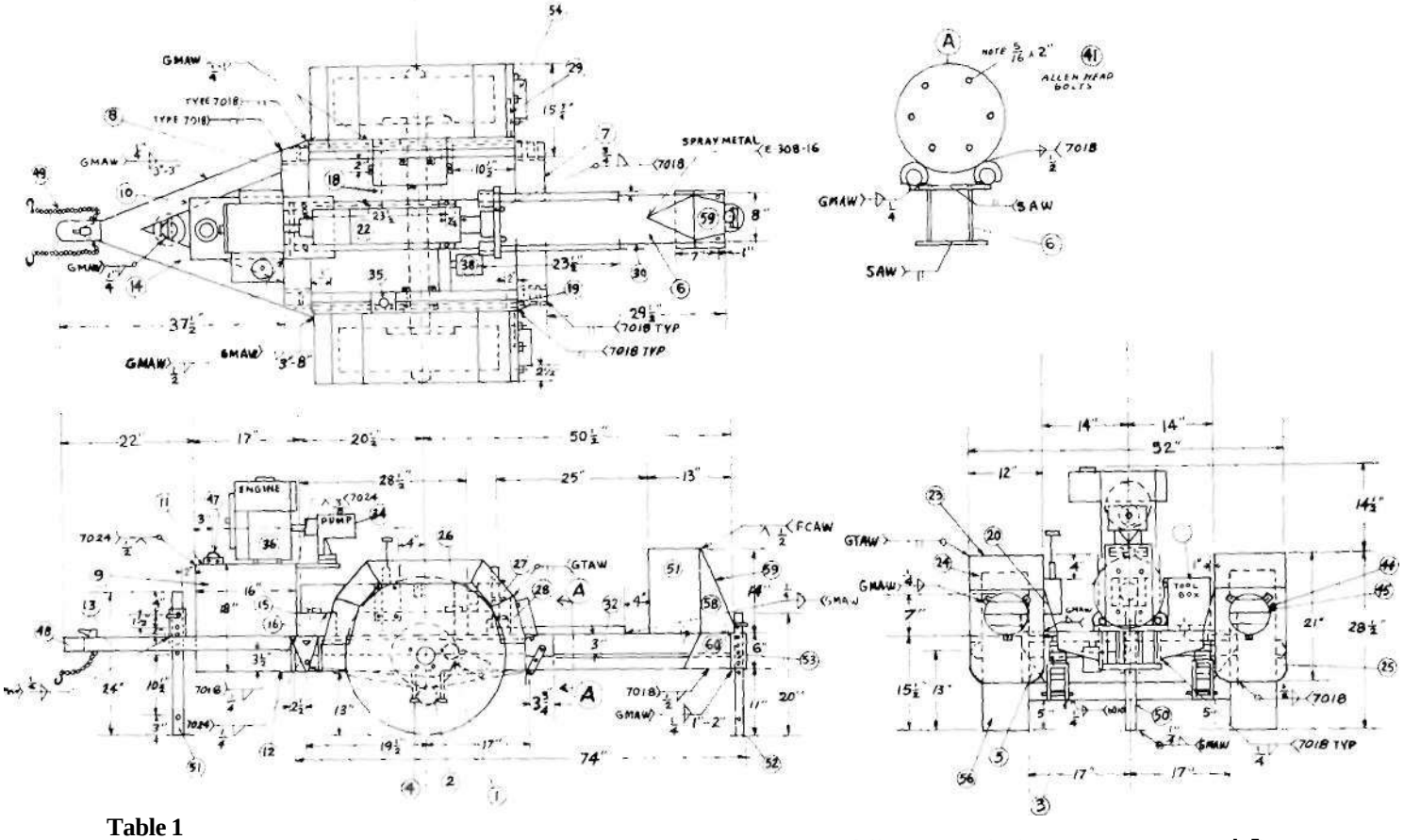

Table 1
Materials

1.	3' 2" Leaf Spring	2 Req	
2.	2" x 34" Standard Pipe	1 Req	
3.	⅜" x 5" U-Bolts	2 Req	
4.	¼" x 1" x 4" Plate	4 Req	
5.	¼ x 3" x 6" Plate	2 Req	
6.	4" x 6" x 6' I-beam	2 Req	
7.	¼ x 5½" x 10" Plate	4 Req	
8.	¼ x 5½" x 11" Plate	4 Req	
9.	¼ x 16" x 18" Plate	2 Req	
10.	¼ x 10" x 18" Plate	2 Req	
11.	½ x 10" x 24" Plate	1 Req	
12.	¼ x 10" x 16" Plate	1 Req	
13.	¼ x 2" x 34" Plate	2 Req	
14.	¼ x 3½" x 34" Plate	2 Req	
15.	¼ x 9½" x 29" Plate	1 Req	
16.	¼ x 4" x 29" Plate	2 Req	
17.	¼ x 6" x 4" Plate	1 Req	
18.	¼ x 2" x 10½" Plate	2 Req	
19.	¼" x 2" x 3<" x 34"	2 Req	
20.	¼ x 2" x 6" Plate	4 Req	
21.	7½" x 9" x 13" Tool Box	1 Req	
22.	Ram 28" fully extended	1 Req	
23.	12" x 18" 16 gauge	2 Req	
24.	8" x 12" 16 gauge	4 Req	
25.	12" x 16" 16 gauge	4 Req	
26.	4" x 18" 16 gauge	2 Req	
27.	4" x 8" 16 gauge	4 Req	
28.	4" x 8½" 16 gauge	4 Req	
29.	½" x 30" electrical pipe	1 Req	
30.	½" x 32" electrical pipe	2 Req	
31.	½" x 36" electrical pipe	2 Req	
32.	1¼" round stock 23"	2 Req	
33.	2½" x 3½" slides	2 Req	
34.	Pump Vickers vane pump #25997	1 Req	
35.	Control Valve, Husco #5041	1 Req	
36.	Engine, Wisconsin Heavy Duty 8 hp. model S-8D	1 Req	
37.	Fluid filled gauge, UCC	1 Req	
38.	Filter, Lenz	1 Req	
39.	67" ¾" hydraulic hose	1 Req	
40.	48" 1½" hydraulic hose	1 Req	
41.	5/16" x 2" allen head bolts	6 Req	
42.	¼" x 2" hex head bolts and nuts	4 Req	
43.	½" x 2" allen head bolts and nuts	2 Req	
44.	2" x 6" pipe	2 Req	
45.	¼" x 6" rod	6 Req	
46.	⅝" x 1¼" hardened bolts	4 Req	
47.	Breather Cap 2"	1 Req	
48.	Hitch 1⅞"	1 Req	
49.	Chain ¼" x 20"	2 Req	
50.	2" x 20" pipe	1 Req	
51.	2" x 24" pipe	1 Req	
52.	5/16" x 4" Plate	2 Req	
53.	2¼" x 6" pipe	2 Req	
54.	Light stop and tail 4"	2 Req	
55.	20' #16 copper wire	1 Req	
56.	Polyglass Goodyear 14" tires	2 Req	
57.	½" x 8" x 14" Plate	2 Req	
58.	½" x 5" x 14" Plate	2 Req	
59.	½" x 5" x 16" Plate	1 Req	
60.	½" x 8" x 6" Plate	3 Req	