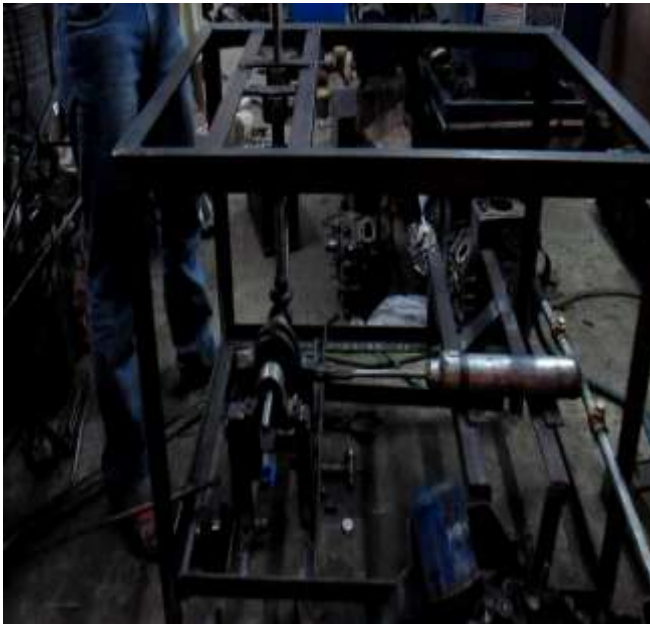


3.2 Figure [3]:



The following are the technical details and specifications for Merry go round pump.

For gear wheel:

Material used = cast iron
 Outer diameter of wheel = $MSR + VSR * LC$
 $= 180 + 30 * 0.02 = 180.6 \text{ mm}$
 Root diameter of wheel = $MSR + VSR * LC$
 $= 172 + 42 * 0.02 = 172.84 \text{ mm}$
 Teeth depth = $MSR + VSR * 0.02$
 $= 4 + 40 * 0.02 = 4.8 \text{ mm}$
 Tooth thickness = $MSR + VSR * LC$
 $= 4 + 27 * 0.02 = 4.54 \text{ mm}$
 Number of teeth = 92

For Pinion

Material used = cast iron
 Outer diameter = $MSR + VSR * LC$
 $= 38 + 22 * 0.02 = 38.44 \text{ mm}$
 Root diameter = $MSR + VSR * LC$
 $= 30 + 22 * 0.02 = 30.44 \text{ mm}$
 Teeth depth = $MSR + VSR * 0.02$
 $= 4 + 27 * 0.02 = 4.54 \text{ mm}$
 Number of teeth = 18
 Bore length of pump = 130 mm
 Cylinder internal diameter = 55 mm
 Cylinder external diameter = 65 mm
 Material used for cylinder = brass
 Types of valves used = horizontal non return valves
 Gear ratio = $NTG / NTP = 92 / 18 = 5.11$

3.3 Advantages of Merry Go Round Pump

- 1) MERRY GO ROUND PUMP provides a play facility for children and to improve the gain of physical energy especially in parks, schools, and also at other public places.
- 2) It has a simple mechanism and maintenance also very easy.

- 3) MGR pump is easy to operate and it will attract the children quickly and is very interesting to get new technical innovations.

3.4 References

Rapid prototyping and digital systems by J.O.HAMBLEN, T.S.HALL, M.D.FURMAN [1]. Rapid prototyping and engineering applications by FRANK W.LIOU [2]. [www.spanpumps.com/merry go round pdf](http://www.spanpumps.com/merry_go_round_pdf) [3] www.playpumps.org [4] www.gizmag.com [5] <http://kids.nationalgeographic.com/kids/stories/peopleplaces> [6]

3.5 Equations

1. Velocity ratio for Gear drive

$$\text{Velocity ratio (n)} = \frac{\omega_2}{\omega_1} = \frac{d_2}{d_1} = \frac{n_2}{n_1}$$

ω = angular speed

d = diameter of the gear wheel

n = speed of the wheel.

2. Gear ratio (g) = NTG / NTP

4. Results and Conclusion

1. For the one complete revolution of Merry go round wheel 4 number of strokes will be obtained.
 2. Thus the maximum discharge = $\pi r^2 l$
 $= 3.14 * 27.5 * 27.5 * 90$
 $= 217.91 * 4$
 $= 871.64 \text{ ml}$
 3. Suction depth is = 4m
 4. Delivery head is = 6m
- By this experimental setup of Merry go round pump we can get the water from underground to the over head tanks without the use of electrical power.

5. Abbreviations

MSR = Main scale reading
 VSR = Vernier scale reading
 LC = Least count
 HNRV = Horizontal non return valve
 NTG = Number of teeth on gear
 NTP = Number of teeth on pinion
 D = diameter of cylindrical bore
 r = radius of the cylindrical bore
 l = length of the stroke

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