M. E. Industries **53**

CHAIN WHEEL & CRANK SET-BICYCLE

I. Product & its use

Chain Wheel and Crank set is an essential item of the bicycle used for transmission of power through the pedal and crank set to the rear wheel of the bicycle for propulsion. It consists of 2 cranks (i.e. left and right) and the chain wheel. The Cranks are hot forged items and the Chain wheel is stamped out from the sheet. The chain wheel is mounted on the right hand side crank and the chain moves on the chain wheel. This item is mainly used as an original equipment by the Bicycle manufacturers but occasionally also used as a replacement item.

II. Market Potential

Cycle is used by common man and due to rising living standard in the rural and urban areas, the demand of the bicycle is increasing day by day. Moreover, bicycles are being exported from India to the undeveloped and developing countries. As stated above, the item is mainly used as O.E. and for replacement in repair of the old bicycles. Hence the item has got good market potential in the home as well as export market.

III. Production Target

It is proposed to manufacture 37500 sets of chain wheel and crank sets per month.

IV. Basis & Assumptions

1. The basis for calculation of production capacity is taken on single shift basis on 75% efficiency and 25 days working per month.
2. The rate of interest has been taken on the basis of 15% on an average. However, this figure is varying depending upon the location of the unit and time of implementation of the project.
3. The rates of the machinery, raw-material and labour are provided at the prevailing rates at the time of preparation of the project report.

V. Production Details & Process of Manufacture

The chain wheel & crank set consists of three parts viz. chain wheel, R.H. Crank & L.H. Crank.

Bicycle chain wheel is made out of M.S. sheet/H.R. Strip/C.R. Strip of about 3 mm. thick. The operations are Blanking, piercing, design punching, teeth cutting etc. are done on Power Presses while cold forming is done on a special purpose machine. After polishing the chain wheel discs these are sent to electroplating section for chrome plating.

Crank forgings i.e. Left hand & Right hand are purchased from outside. These forgings are subjected to operations like grinding, B.B. axle hole drilling, Cotter Pin hole drilling, Pedal axle hole drilling, reaming, tapping, turning etc., at various stages in manufacturing on different machines. After grinding and buffing, these are sent to electroplating section for plating.

In the assembly section electroplated R.H. Crank and Chain wheel are fixed together and rivetted on rivetting machine. Then both the cranks are reamed in the B.B. axle hole & C.P. hole to remove electroplating deposits, if any. The R.H. crank & wheel is checked for its true runnings.

Finally the Chain wheel and crank set is cleaned with chalk powder to remove oil stains, if any, before these are packed and despatched.

VI. Quality Control & Standard

The product standards are maintained as per I.S. No. IS-1281-1968 (revised in 1976) from Bicycle Cranks and Chain wheels.

VII. Land & Building

The total covered area required for the project is 500 sq. metres with sufficient open space	6,000

Rented @ Rs. 6000/- per month.

VIII. Machinery & Equipment

(A) Chain Wheel Section

	No. off.	H.P. (reqd.)	Price (Rs.)
1. Strip shearing Machine (Lever type) 350 mm. cap	1	1	3,000
2. Strip Sizing Machine (Cold Rolling type)	1	15H.P.	40,000
3. Strip straightening Machine (Special purpose	1	10 H.P.	25,000
4. Power Press 150 Ton cap. C.I. Body, Pillar type, complete with electricals	1	15 H.P.	65,000
5. Power Press 100 Tons cap. C.I. Body, Piller type, complete with electricals	1	10H.P.	48,000
6. Power Press 75 Ton Cap. C. I. Body, Piller type, complete with eletricals.	1	7.5 H.P.	37,000

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	No. off	H.P (reqd.)	Price (Rs.)
7. Power Press 30 Ton cap. C. I. Body, Piller type, complete with electricals.	1	3H.P.	22,000
8. Power Press 10 Ton cap. C. I. Body, Piller type, complete with electricals	1	2H.P.	14,000
9. Disc Forming Machine for Chain wheel (special purpose) complete with electricals.	1	15H.P.	40,000
(B) Crank Machining Section :			
10. Special purpose Five spindle Drilling Machine for B.B. Axle hole	3	3 H.P. each.	30,000
11. Special purpose Five spindle Drilling Machine for Pedal Axle hole	1	3 H.P.	10,000
12. Drilling Machine 20 mm cap.	2	1H.P. each	9,000
13. Drilling Machine for Reaming of B. B. Axle & C. P. hole.	2	2 H.P. each.	9,000
14. R. H. Crank Turning Lathe Adda	2	2 H.P. each	15,000
15. Power Press 5 Ton cap.	1	1 H.P.	8,500
16. Power Press 25 Ton Cap. C. I. Body, Piller Type, complete with elects.	1	3 H.P.	21,000
17. R. H. Crank under cut tturning lathe Adda(Special purpose)	1	1 H.P.	7,500
18. Pedestal Grinder motorised, 250 mm.wheel dia	1	1.5	3,000
19. Double spindle Drilling Machine for C. P. Hole.	4	2 H.P. each	3,200
20. Bench Grinder 200 mm dia.	1	0.5 H..	1,500
21. Drilling Machine 20 mm. cap. for C. P. Hole Chamfering	1	1H.P.	4,500
22. Drilling Machine for 15 mm cap. Reaming of C. P. Hole.	1	1 H.P.	3,500
23. Double Spindle Drilling Machine 16 mm. cap.	1	1 H.P.	7,000
24. Three spindle Tapping Machine for Pendal Axle hole (special purpose)	1	2 H.P.	8,000
25. Power Press 5 Ton cap. stamping	1	1 H.P.	8,500
(C) Assembly Section			
26. Hydraulic Power Press 30 Tons Capacity complete with electricals	1	2 H.P.	20,000
27. Power Press 30 Ton cap. C. I. Body, Piller type, complete with electricals.	1	3 H.P.	22,000
28. Rivetting Machine	1	2 H.P.	10,000
29. Reaming Machine for BB. Axle Hole (special purpose)	1	1 H.P.	3,000
30. Reaming Machine for C.P. Hole (special purpose)	1	1 H.P.	3,000
31. Chain Wheel Trawing Fixture	1	..	1,000
(D) Buffing & Polishing Section			
32. Buffing and Polishing Addas Motorised	12	3 H.P. each	60,000
(E) Electroplating Section			
33. Electroplating Plant complete including Rectifier, Tank, air compressor & other Accessories suitable for plating of 1500 sets chain wheel crank per day		20 H.P.	1,50,000
(F) Testing Equipments			
34. Hardness Testing Machine	1		
35. Load Testing Fixture	1		15,000
36. Plating thickness testing BNF Jet apparatus and Feroxyle and adhesion test.	1		
37. Dies, Tools, Jigs, Fixtures and other Measuring Instruments.			1,50,000
			9,06,000
38. Electricification and Installation charges @ 10% of the Machinery			90,000
39. Office Furniture and other equipments etc			15,000
Total			10,11,000

IX. Staff & Labour

(a) Administrative / Supervisory	No.	@Rs.	Rs.
1. Manager	1	1,600	1,600
2. Accountant	1	1,200	1,200
3. Clerk	1	600	600
4. Store Keeper	1	600	600
5. Peon cum Chowkidar	1	560	560
6. Sweeper part-time	1	140	140
Total	6		4,700
(b) Technical & Others			
1. Foreman/Engineer	1	1,400	1,400
2. Inspector/Supervisor	2	750	1,500
3. Skilled operators	20	700	14,000
4. Semi-skilled operators	30	600	18,000
5. Helpers	10	560	5,600
6. Packers	4	560	2,240
7. Staff Welfare @ 15 % of 42840/- (6326/-) say Rs. 6360/-			6,360
	55	Total	49,100

G. Total (a) + (b)

G. Total 4,700 + 49,100

=Rs. 53,800

X. Raw Material Requirement (Per month)

Description	Qty.	Rate	Amount Rs.
(a) H. R. Strip & Coils 3 mm. thick for 37500 set of Chain wheel @ 1.05 Kg. per piece= 39.375 Ton say 39.4Ton	39.4 Ton	7,700	3,03,380
(b) Bought our Forged Crank (set of two pieces)	37,500 Set	8/50	3,18,750
(c) Nickel Anode & other chemicals for Electro-plating.	37,500 Set	1/50	75,000
Total			6,97,130

XI. Other Expenses (Per month)

1. Water & Electricity charges	7,500
2. Postage & Stationery	500
3. Oils & Lubricants.	2,000
4. Repair & Maintenance	5,000
5. Cartage & Freight	3,000
6. Travelling & Conveyance	1,000
7. Packing	7,500
8. Rent	6,000
9. Other unforseen Expenses	500
10. Publicity/Advertisement	500
Total	33,500

XI. Working Capital (Per month)

1. Raw Material	6,97,130
2. Salaries & Wages	53,800
3. Other Expenses	33,500
Total	7,84,430

XII. Total Capital Investment

1. Total working capital for 3 months	23,53,290
2. Machinery & Equipment	10,11,000
	33,64,290
Say	33,64,300

XIII. Cost of Production Per annum

1. Recurring Expenses (W. C. per year)	9,413,160
2. Depreciation on Machinery @ 10%	90,600
3. Interest on capital Investment @ 15% of 3364,300 = Rs. 504645 Say 504600	5,04,600
Total	1,00,08,360
say	1,00,08,300

XIV. Sales Proceeds Per annum

1. By selling of 4,00,000 set of chain wheel crank @ Rs. 21.50 each	86,00,000
2. By selling of 50,000 set of chain wheel crank (IInd quality @ Rs. 20/- each)	10,00,000
3. By Selling of Scrap of 270 ton @ Rs. 4000 per ton	10,80,000
Total	1,06,80,000

XV. Profitability

Profit = Sales − Production cost

= 10,680,000 − 10,008,300

= 6,71,700

(a) Percentage of profit on sale $= \frac{671700 \times 100}{10680000} = 6.8\%$

(b) Percentage return on investment $\frac{671700 \times 100}{3364300} = 20\%$ approx.

B. E. P.

(1) Rent	72,000
(2)	90,600
(3) Interest	50,4600
(4) 40% o salaries	2,58,24,000
(5) 40% other charges (Excluding rent)	11,C0,0C0
	9,36,440
say	9,36,400

$$\text{B.E.P.} = \frac{\text{Fixed cost} \times 100}{\text{(Fixed cost + Profit}} = \frac{936400 \times 100}{936400 + 671700} = 58.2\%$$

XVI. Names & Addresses of Machinery Suppliers

1.	M/s Dass Mech. Workers, Model Town, Ludhiyana	Cold Rolling Machine
2.	M/s Metalord Industries, Shed No. E-94, Focal point, Ludhiyana	S. P. Machies & Lathes Machines.
3.	M/s Badsal Machine Tool Corporation, 5945, Street No. 10, Dashmesh Nagar, Ludhiyana.	Do.
4.	M/s Amar Foundry & Engg. Works, G. E. Road, Batala.	Lathes, Drilling Machines
5.	M/s Puri Engg. Works, Gill Road, Ludhiyana	S. P. Machines Lathes, Drilling M/c
6.	M/s Ram Bros, Pvt. Ltd.	Lathes Drilling Machine, Hacsaw Machine & S. P. Machine.
7.	M/s Free India Engg. Corporation, Kot Mit Singh, Tarn Taran Road, Amritsar.	Power Presses
8.	M/s Sharda Foundry & Engg. Works, G.T. Road, Batala	Lathe Machines
9.	M/s B.T. Machine Tools, 275-A, East Mohan Nagar, P.O. Golden Temple, Amritsar	Drilling Machine

10.	M/s Ametup Machine Tools Pvt. Ltd., 5th Floor, Surya Kiran, Kasturba Gandhi Marg, New Delhi.	Power Presses & Shearing Machines
11.	M/s Sekhon Mech. Works, Vishvakarma Chowk, Miller Ganj, G.T. Road, Ludhiyana	Power Presses
12.	M/s S.S. Mech. Works, 805, Ind. Area 'B' Ludhiyana.	Power Presses. & Shearing Maches.
13.	M/s Dashmesh Mech. Works, 526, Indl. Area 'B', Ludhiyana.	S.P. Machine for Cycle parts
14.	M/s Paramount Machine Tools Corp., 812, Industrial Area, 'B' Ludhiyana.	—Do—

XVII. Suppliers of Raw Material & Forged Components :

For Raw material State Small Industrial Corporation may be contacted or from the open market.

For Forged Cranks :

1. M/s. Joyti Industries, C-20, Focal Point, Ludhiana.
2. M/s. Aroma Steels, D-14, Focal Point, Ludhiana.
3. M/s. Happy Machine Tools, Backside Raja Vanaspati, Kanganwal Road, Ludhiana.
4. M/s. Cannon Forging, D-12, Focal Point, Ludhiana.

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