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SPECIFICATION FOR COMB FOUNDATION MILL

(First Revision)

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Indian Standard

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(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 20 November 1978, after the draft finalized by the Apiary Industry Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 The comb foundation mill is used for embossing plain and pure beeswax sheets with the exact cell outline of the honeycomb for fixing into the frames of a beehive. Such embossed comb foundation sheets form a base for the bees to build up new combs. This helps to conserve the energies of bees to secure drawn-out combs of adequate cell-size duly related to natural body-size of local races of bees for which IS : 2072-1976*, has already been issued. Thus, in order to serve the needs of the entire country there have to be different cell sizes.

0.3 The main structure of the comb foundation mill consists of two rollers fixed horizontally close together in a cast iron frame. The surface of these rollers has a honeycomb cell design which embosses the comb foundation sheets.

0.4 This standard was first published in 1966. The present revision incorporates a number of modifications, namely:

a) The length of the rollers has been changed to the minimum necessary to effect economy,

b) requirement as to matching of the honeycomb cell engravings with the revised cell-size specified in the relevant Indian Standard has been included, and

c) additional requirements for galvanization of the mechanical parts, and packing of the mill have been included.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained

*Specification for comb foundation sheets (*first revision*).
†Rules for rounding off numerical values (*revised*).

in the rounded off value should be the same as that of the specified value in this standard.

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1. SCOPE

1.1 This standard prescribes the requirements for the comb foundation mill used for embossing plain and pure beeswax sheets with the honeycomb cell outline.

2. DESCRIPTION

2.1 The comb foundation mill shall have the following main parts (*see also* Fig. 1):

a) Frame;

b) Rollers;

1) Roller body,

2) Roller shaft, and

3) Roller surface;

c) Roller adjusting device;

d) Roller springs (to keep the rollers in position);

e) Handle;

f) Gears;

g) Bearings;

h) Oil tubes (with spring cap);

j) Water tub;

k) Screws; and

m) Alignment synchronizer.

3. MATERIALS

3.1 The materials for the manufacture of rollers, gears and bearings shall be as given in Table 1. For other parts, materials indicated in Table 2 may be used.

4. SHAPE AND DIMENSIONS

4.1 Shape — The shape of the comb foundation mill may be as given in Fig. 1.

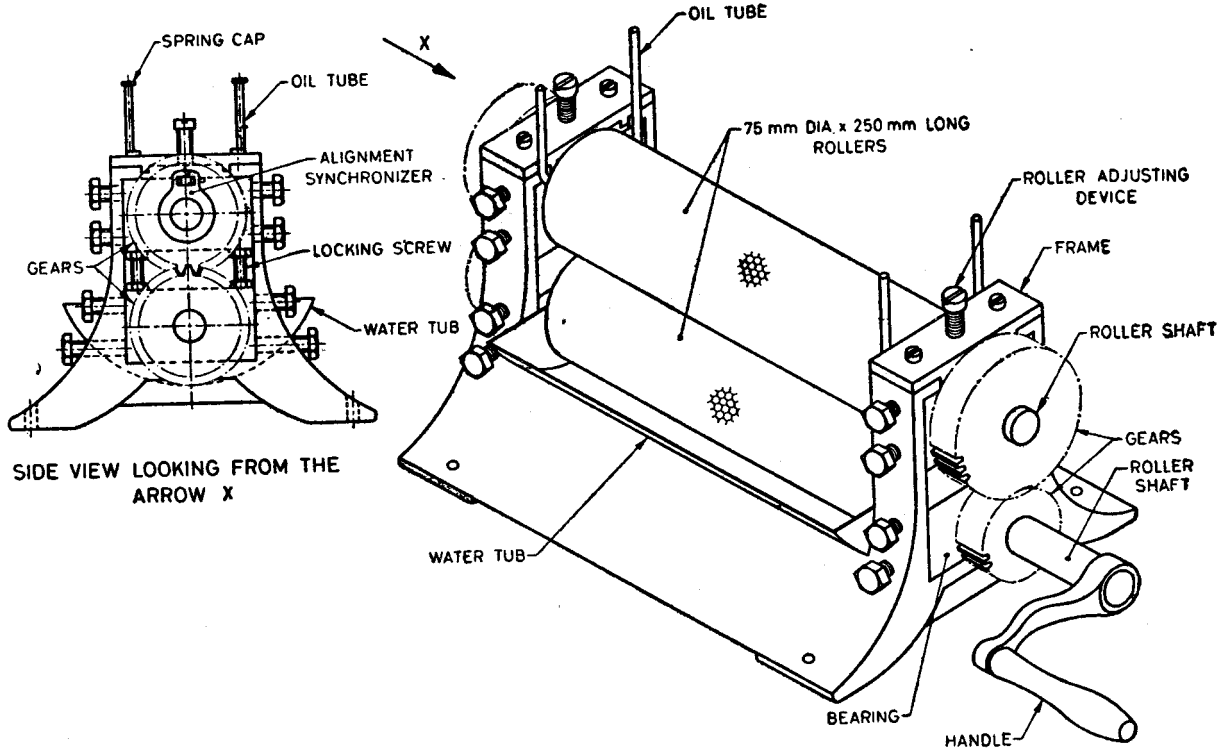

FIG. 1 COMB FOUNDATION MILL

TABLE 1 REQUIREMENTS OF MATERIALS FOR ROLLERS, GEARS AND BEARINGS OF THE COMB FOUNDATION MILL

(*Clause* 3.1)

Sl No.	Name of the Part	Material	Conforming to	Grade
(1)	(2)	(3)	(4)	(5)
i)	Rollers:			
	a) Roller body b) Roller shaft	Fringed steel	IS : 1570-1961*	C 40
	c) Roller surface	White metal	IS : 25-1966†	—
ii)	Gears	Fringed steel	IS : 1570-1961*	C 40
iii)	Bearings	Cast iron	IS : 1865-1974‡	3 B

*Schedules for wrought steels for general engineering purposes.
†Specification for antifriction bearing alloys (*revised*).
‡Specification for iron castings with spheroidal or nodular graphite (*second revision*).

TABLE 2 REQUIREMENTS OF MATERIALS FOR OTHER PARTS OF THE COMB FOUNDATION MILL

(*Clause* 3.1)

Sl No.	Name of the Part	Material
(1)	(2)	(3)
i)	Frame	Grey cast iron
ii)	Roller adjusting device	Cast iron or any other suitable material
iii)	Handle	Cast iron, fringed steel or any other suitable material
iv)	Water tub	Galvanized steel sheet or any other suitable material

4.2 Dimensions — The dimensions of the various components of the comb foundation mill (*see* Fig. 1) as given in **5.2** to **5.7** pertain to a particular type and are for guidance only.

5. ASSEMBLY

5.1 Frame — The cast iron frame shall be suitably designed to hold the rollers (*see* **5.2**) horizontally and to hold the water tub having a semi-circular bottom. The frame shall have suitable arrangement to fix the mill during operation. The construction of the frame shall be such that it remains stable during operation.

5.2 Rollers — There shall be two rollers, namely, the top roller and the bottom roller. The surface of the rollers shall be engraved to have the hexagonal honeycomb cell outlines matching with the cell-sizes specified in IS : 2072-1976*, so as to get the size of the cell embossed on plain beeswax sheets and also the cell walls shall very clearly stand out as prescribed in IS : 2072-1976*. The minimum diameter of the rollers shall be 75 mm and the minimum length 100 mm. The rollers shall have suitable opening in the centre to allow the passage of the roller shaft (*see* **5.3**).

5.3 Roller Shaft — The roller shaft shall be of fringed steel bar of at least 22 mm in diameter. The ends of the rollers shall fit into the bearings (*see* **5.6**) provided on either sides. The groove shall be connected to the oil tube.

5.4 Roller Adjusting Device — A suitable device shall be provided in the mill to adjust the clearance in steps of the top roller with the bottom roller as desired to get proper alignment. The steps may preferably be in 1, 1·5 and 2 mm. A suitable locking arrangement at the lowest recommended position shall be provided to avoid damage to the surface of the rollers. The gear shall remain loose on the top roller shaft.

5.5 Alignment Synchronizer — A suitable device shall be provided so as to have synchronized alignment of the two rollers.

5.6 Bearings — There shall be four bearings at the ends of the two rollers to support the roller shafts. The bearings shall have openings in the centre to allow the passage of the roller shafts. The bearings shall be so assembled as to be easily lubricated and replaced, when desired.

5.7 Gears — There shall be four fringed steel spur gears. The width of the teeth of the gears shall be about 20 mm, module 2 (12 DP) and number of teeth 30. These may be cast integrally with roller shafts.

5.8 Handle — The handle shall be suitably fixed into the shaft of the bottom roller. A suitable grip shall be provided. The handle shall be operated sideways.

6. WORKMANSHIP AND FINISH

6.1 Frame — The frame shall be free from blow holes and cracks and the surface of the frame shall be made smooth. The frame may also be enamel-sprayed.

6.2 Water Tub — The water tub of the mill shall be properly brazed or soldered to avoid leakage.

*Specification for comb foundation sheets (*first revision*).

6.3 Gears — The gears shall be finely machined all over.

6.4 Handle — The handle may be spray-enamelled.

6.5 Screws — All removable screws shall be made rust proof independently before assembly.

6.6 All mechanical parts should be suitably galvanized to prevent rusting.

7. MARKING AND PACKING

7.1 The comb foundation mill shall be marked with the following particulars:

a) Manufacturer's name or recognized trade-mark;

b) Year of manufacture; and

c) Batch or code number.

7.1.1 Subject to an agreement between the purchaser and the vendor, the marking may be done on a brass plate soundly soldered to the frame of the comb foundation mill.

7.1.2 Each comb foundation mill may also be marked with the ISI Certification Mark

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

7.2 Packing — The comb foundation mill shall be packed as agreed to between the buyer and the supplier.

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