OPERATIONAL LINE FOR HONEY EXTRACTION AND PACKING IN COMMERCIAL APIARIES

I. SADOVNIKOV
USSR

The task of beekeepers working in commercial apiaries at present is not only to produce the greatest possible quantity of honey but also to assure adequate processing and packing in small quantity pots — with label on them indicating the producing unit, all this without damage done to its initial qualities. This leads to improved honey quality and to higher profitableness of apiaries.

To this end, apiaries are endowed with proper equipment, according to its productivity, the technology used, the continuous production, and the maximum production capacity. Typical for the commercial apiaries in USSR is the operational line for honey extraction and packing used at Kuzminsk apiary of the Bee Research Institute.

The honey house (Fig. 1, 2) has several rooms housing : the foundation stores (41.3 sq m), the heating room (9.1 sq m), the room for extraction, processing, and packing of honey (67.2 sq m) and a room with boilers, also provided with devices for washing the packages (16.8 sq m). Outside the honey house, a 1 m-high platform (24) exists all along the wall, with roof.

The supers from which honey is to be extracted are transported from the apiary or other locations to the honey house. The supers are unloaded on a little cart which is on the platform, just near the truck. The loading platform is at the same level as the truck body, which facilitates the loading-unloading operations. The supers (1) are wheeled into the foundations storage room which at that time is used as temporary storehouse for the supers with honey. For the transport of supers to the storehouse, an inclined plane (25) is fixed on the steps of the platform. From the storehouse, the supers are carried by cart to the heating room where they are stacked on special stands. Heating and circulation of hot air is done by a 4 kW electric heating radiator (3). Temperature is controlled by a PTR-3 thermoregulator with semiconductors — being of 32—38°C. Supers are left for 10—12 hours in the heating room. Heating of combs before extraction decreases honey viscosity, which assures more thorough and faster extraction of honey from combs, and less broken combs. Also in the heating room, part of the water existing in honey is removed. 275 supers (4.5 tons of honey) are placed in the heating room, stacked in two tiers. Then the supers with the honey heated up to 25°—30° are wheeled (4) into the extraction room, and put on the comb uncapping desk (5). Combs are uncapped by two horizontal vibrating knives (6) fixed on the front side of the desk. The cappings drop into 3 wire mesh boxes (430×450×450 each). Two of them are placed under each of the uncapping knives, and the third is at hand for replacing the box which fills up. From the cappings in the boxes honey drains to the bottom of the comb uncapping desk and from there flows down into the settling tanks. The uncapped frames are stacked on a two-storey revolving

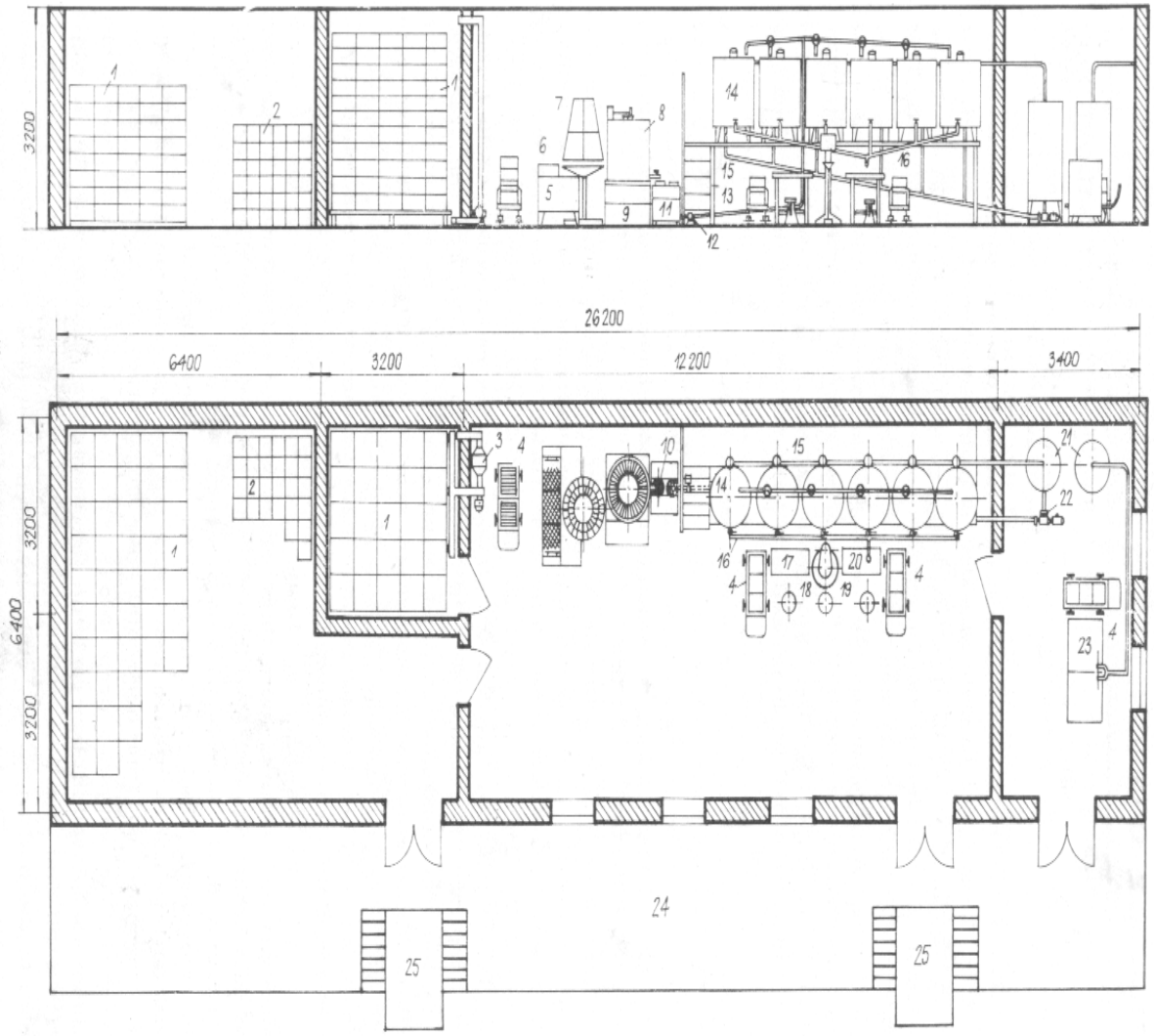


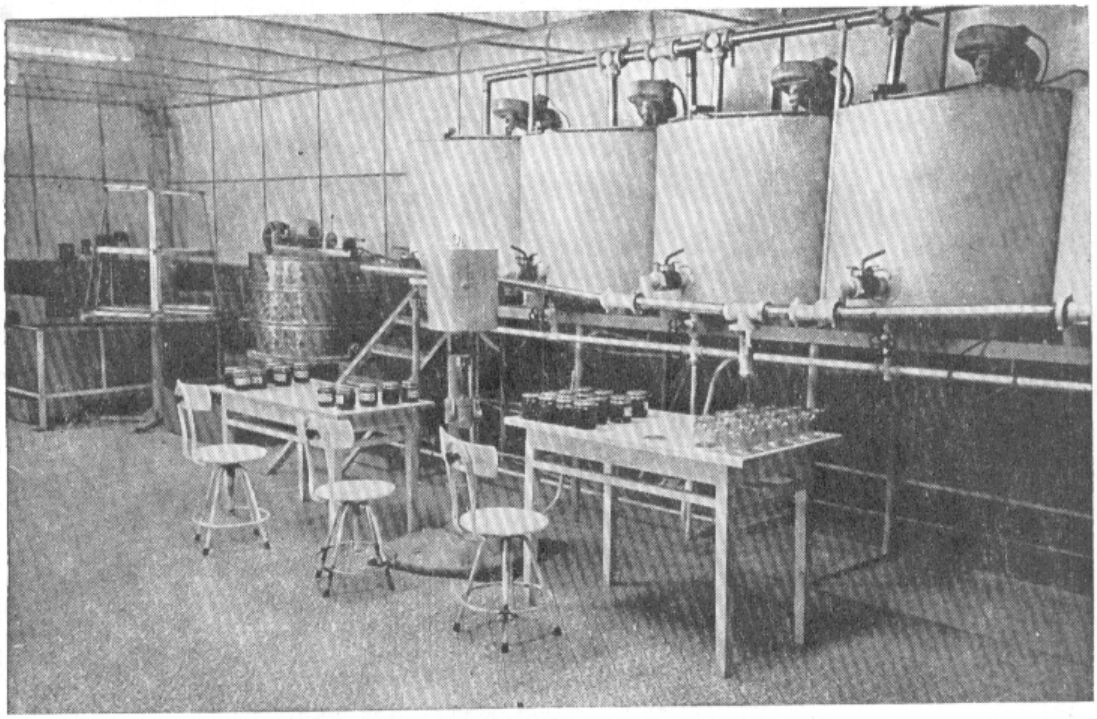
Fig. 1. *Scheme of operational line and of other equipment in Kuzminsk apiary :* 1. Supers to be extracted ; 2. Pots with honey ; 3. Electrically heated radiator ; 4. Cart for transporting supers and packed honey ; 5. Desk for uncapping combs ; 6. Horizontal vibrating uncapping knife ; 7. Two-storey revolving shelf for uncapped frames ; 8. Radial extractor for 50 frames ; 9. Stand for extractor ; 10. Honey filter ; 11. Double-jacketed sump tank for extracted honey ; 12. Honey pump ; 13. Honey pipe leading to the settling tanks ; 14. Honey-settling tanks ; 15. Metal platform ; 16. Pipe line through which honey flows from the settling tank to the distribution cock ; 17. Desk for attaching labels on pots ; 18. Device for fixing tight metal caps ; 19. Desk for pots with honey ; 20. Distribution cock for bottling of honey ; 21. Electric heaters of water ; 22. Inclined pump for circulation of heated water ; 23. Basins for washing pots ; 24. 1 m. high platform ; 25. Inclined planes.

shelf (7) holding 100 frames. The revolving shelf is located so as the honey drains on the botoom of the comb uncapping desk. From the shelf, the uncapped combs are introduced into the radial extractor MP-50 A (8) fixed on a special stand (9), holding 50 frames. Extraction lasts for 15 minutes.

The empty supers are carried to the centrifuge where they are loaded with the extracted combs, then they are carried to the storehouse and further on to the apiary.

From the centrifuge, honey flows through a sieve (10), into the swamp tank (11). Two filters operating alternatively exist above the double-jacketed tank. Water at 50°C circulates between the two walls of the tank. From it honey is pumped (HPM-5 pump) (12) through the honey pipe (13) into VDP-300 honey settling tanks (14). The 3-way cocks preceding each settling tank allow for pumping different kinds of honey in each tank, separately. All honey settling tanks can hold 3 tons of honey. They are placed on a 1.1 m high metal platform. Another platform exists close to them enabling access for observations concerning the condition of honey (15). Within the settling tanks, mixers exist which assure uniform heating of the whole quantity of honey. A device exists in each settling tank which automatically stops the pump when the tank fills up with honey. All settling tanks are connected to the water heating system including an electric water heater VET-400 (21), honey pipes (14), the sump tank (11), a diagonal pump TSNIPS 20(22) which pumps water into and out of the heating system, and a PTR-3 thermoregulator with semiconductors for automatic control of water temperature.

It is a known fact that honey may be injured very easily but to purify it is very difficult. An efficient means for purification of honey in the apiary, along-



The honey processing operational line

side straining, is settling. Settling takes place substantially faster whether honey is heated at 40°C. In order to prevent injury of honey, it is kept in settling tanks at 40°C for 8—12 hours. Whether not heated, honey may be left there for a longer time.

At the bottom of the settling tanks, the delivery connections end into a pipe (16) inclined down to the distribution cock (20) by which honey is bottled into standard pots of various sizes. When honey is let out of any of the settling tanks, it flows freely through the pipe (16) to the distribution cocks (20) : one of 2 inch, with inside diameter of 34 mm for 0.5 l and larger pots or for bottling of cooled honey, and the other, of 1.5 inch and inside diameter of 28 mm — for bottling of warm honey (35°—50°C), or in pots of less than 0.5 l.

The pots with honey are transported to the ABPL-20/16 semi-automatic capping device (18) where metalic caps are tightly fixed, and then to the reception desk (17). Whether honey is bottled into pots with screw caps, then the pots are transported directly to the reception desk where labels indicating the firm are sticked to them and then they are packed into boxes. The boxes (2) are carried by cart to the storage room.

The washing section is equipped with two basins (23) for washing of glass pots. Hot water is supplied by the VET-400 (21) electric heater.

The operational line has the capacity of 1.5 tons of honey packed in 1/2 l pots in 8 hours. Its cost is redeemed in 1—2 years of operation.

The analyses of honey made regularly — previously and after processing — for moisture content, diastase activity, and HMF content allow for making sure that extraction, processing and bottling of honey has no negative effect on quality requirements.

Processing and bottling of honey in small pots, at the producing apiary, diminish the possibility of honey being injured and is economically profitable.