Two improved Laval separators, costing £66, separate 175 gal. of rich milk per hour, being 55 gal. more than a Danish separator, and at £14 less money. Two Laval's can be set so as to discharge their cream into one can and their milk into another. In point of fact this may be seen exemplified at the Shorthorn Dairy, London, &c. For a small dairy, a single Laval doing 300 to 350 quarts per hour will suffice, as it will separate the milk as fast a small dairyman can milk his cows, and for larger dairies any number required can be driven from a common lay shaft 3 feet for two separators.

The engraving, fig 28, illustrates the improvements which effect these important results. It will be seen, on comparing it with fig. 2 below, already referred to, that the inverted T supply pipe and cream and milk discharge pipes have been removed from the centre of the revolving milk drum, and the configuration of the milk drum itself much simplified in construction. In the old machine the neck of the milk drum was made in separate pieces, and bolted to the body of the drum

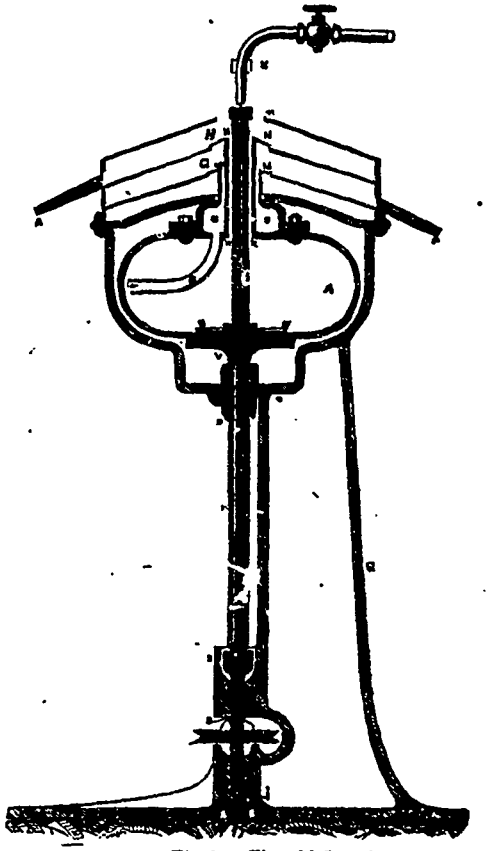

Fig 2.—The old Laval.

by four bolts, the supply pipe being in the interior of the cream discharge tube, and the latter surrounded by the milk discharge tube. All this complicated mechanism is done away with, and the neck and body of the milk drum A, formed of best wrought steel, is in one piece, not unlike an old-fashioned wide-mouthed bottle. This shape greatly increases the strength of the drum, lowers the centre of gravity, which makes it more easily driven for separating the cream, as it rotates more steadily. It is also more handy for being removed from the chamber in which it works, also for taking off the last cream and for cleaning.

The standard D has been improved from top to bottom. The principle is the same, but the details of construction are different. There are two driving spindles, as in the old machine—viz., the spindle *l* of the driving pulley *k*, which rests on a convex support on the top of the foot screw *i*, which can be put in and taken out without unbolting the standard from the bed plate of the floor. This is a very important practical improvement, as the screw of the old one had to be put in from below, which could not be done without taking the separator to pieces so as to turn over the standard. The spindle of the milk drum rests on wood in the box *m*, on the top of the driving pulley spindle *l*, and is supported in a strong bearing *g*.

The lubrication of both spindles has been improved. At *h* is a cup for lubricating *g*, supplied by a pipe from a cup on the outside of the milk drum chamber, conspicuous on the left side. Below *g* is a close cup collar, which intercepts the spare oil from that bearing, directing it into a small brass pipe on the inside of the standard D, which conveys it down to the bearing R, of the pulley spindle. The bearing, O, of the pulley spindle is lubricated as before.

The chamber in which the milk drum A rotates forms the upper part of the standard D. In the old machine this had to be held together by a heavy cover. In the new separator this cover is not required. The milk tray B, with its outlet pipe, rests directly on the edge of the chamber, and the cream tray C on the top of B The two trays are the same as in the old separator, and held in position by a tripod, only one leg of which is seen in the cut on the right hand side.

A funnel-mouthed cup, *a*, fits closely into the neck of the milk drum—about the capacity of a pint. From the bottom the supply pipe descends. It is soldered to a thin metal plate, in the form of a wing, from the bottom of the cup, in size and shape as shown in the engraving. On the opposite side the milk exit pipe, *b*, shown in section, is soldered to the neck of the milk drum. It curves round at the bottom, its mouth being open to catch the milk, as it were, on the principle of an Archimedian screw. In the old machine, the mouth of the exit pipe opened the other way, adverse to centrifugal force. And, although there can be very little, if any, Archimedian screw action, the milk and the mouth of the screw moving in the same direction, and at equal velocity, there is, nevertheless, an influent current of milk into *b*, due to the force of the influent milk from the supply pipe in the bottom of *a*, and the position of the mouth and bend unquestionably favours a more rapid entry of milk as compared with the old machine, the actual discharge being one and a half times greater, *i. e*, 87½ gal. per hour instead of 30.

At *c* a small hole is pierced through the neck of the drum A into the pipe *b*, and out at this orifice the milk is forced by centrifugal action over a ledge-ring *d* that surrounds the neck of the milk-drum, guiding it into B. Around the funnel-cup *a* there is an open space *d* between it and the neck of the milk drum. Into this space the cream is forced up by centripetal action, and out at the small aperture *e* over a ledgering immediately below into the cream tray C. The size of the aperture *e* is regulated by a screw *f* above. In making this aperture narrower the cream obtained will be thicker, and, *vice versâ*, by enlarging it the cream will be thinner.

The internal diameter of the milk drum A is the same as that of the old drum—11 inches, and the velocity required to separate the cream about 6000 revolutions per minute. When working at full speed the funnel-cup *a* is comparatively empty, the milk being thrown down through the supply pipe into A as fast as it flows into *a*. Looking down into *a*, not a drop of milk is to be seen in it, whereas, were it allowed to stand on a level with the milk outlet *c*, the surface would be perceptible to the eye, whilst, were it allowed to rise to the level of *e*, in the centre of the cup *a*, it would flow over the edge of the cup from its centrifugal action. Hence the practical rule in feeding the cup is that the milk shall not be seen in it.