TRUE PHILOSOPHY OF BUTTER-MAKING.

The following most lucid and intelligible statement of the science and art of butter-making, which is made by the proprietors of the patent of Fitch's "Pendulum Churn," is so interesting that we present it in full to our readers:—

"As we all know, butter exists in the form of minute balls or globules, each being enclosed in a sac or membrane-like covering. It is not the *material of which butter is made* that is contained in these little sacs, but *butter itself*, in a perfect state. While invested with their coverings. these globules float about in the milk, or rise to the top as cream, but cannot be made to adhere together. Before this can take place, the coverings must be removed. The effect of 'churning' is to remove them, thus liberating the butter, and then to bring them together into a mass. These facts are known to all intelligent dairymen. But now comes the error, namely, the supposition that it is of no consequence *how* the coverings of the butter globules are removed and the contained butter liberated; that it is of no moment whether the butter globules are crushed or ground between hard surfaces, or burst by concussion from being dashed violently against hard substances, or by whirling bars, slats or rods rapidly though the milk or cream; or whether they are released from their investments in some more gentle manner. Now this is all a mistake. It *is* of the most essential importance, if we would have good butter, how the globule is divested of its covering; and we will state why.

"Butter being in the most perfect condition possible while it is in its globular state, and covered with its natural investment, any change of that condition excepting the mere removal of this investment, whether from the temperature being raised too high, from the globules being crushed, mashed or broken down, or their natural conformation being in any other manner destroyed or to any extent altered, necessarily injures the quality of the butter. (This fact, hitherto entirely overlooked, is the discovery hereinbefore alluded to.) It is for this reason that too much butter is injured by being 'worked,' which is only a process of pressing the globules upon each other, and thereby crushing them out of their original shape and state into a compact mass, like lard. It is for this reason, also, that the modern contrivances for *grinding* milk and cream between metallic rollers or revolving disks, and all the quick-moving rotary churns, while they may 'bring the butter' quickly, injure its quality, making good grease rather than good butter. The best butter is said to have a 'grain.' What does this mean? Simply that the original globular formation of the butter has not been broken down, and just to the extent that it *is* broken down is the quality injured; the 'grain' disappearing, and the mass becoming 'greasy' and lard-like. The butter globule must not, then, be divested of its covering by any process which shall break down its original structure, if we would have good butter.

"What, then, is the true method of removing the coverings of the butter globules? We answer that it is to wear them off by the rubbing of the globules against each other and upon the fluid surrounding them; not by crushing or bursting them by grinding, pressing or striking them with or against hard substances, but by a continous but gentle *agitation*, causing friction among the globules themselves.

"Another essential is that all the butter globules shall be divested of their coverings, as nearly as possible, at the same time; otherwise, some are too much 'worked' before the others are free, and some may not be liberated at all, and remain in the butter-milk.

"Now, if the reader will notice the construction and operation of the 'Pendulum Churn,' as represented in the annexed cut, he will see that it fulfils all the requisites we have pointed out. There is no violent dashing about of the cream; there are no slats or bars or rods whipped rapidly through it; but, from the peculiar shape of the body of the churn and dasher, by slowly swinging the dasher to and fro, the cream is thrown into agitation which, while it is not violent, and therefore cannot heat it or disturb the natural condition of the butter globules is, at the same time, of such a character as to cause the most effective friction among the globules upon each other, quickly removing their investments, but leaving them *whole*. Then the entire mass of the cream being moved with each vibration of the dasher, and the butter globules being thus all subjected to equal and uniform friction, they must all be liberated at about the same time; then, by a few strokes of the dasher, the butter is 'gathered,' and the work is done."

The swinging or pendulum dasher, A, is firmly secured in the axle, B, so that it swings very near the bottom of the churn without quite touching it. The plate,

Fig. 2

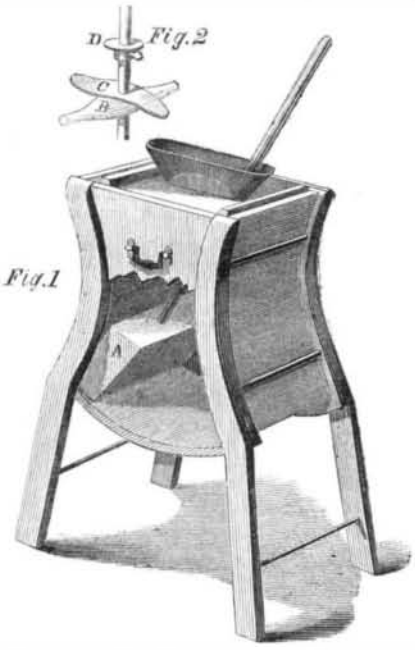

Fig. 1

C, is used merely to close the slit in the cover of the churn, to prevent the cream or milk from being dashed out. A plate, D, adjustable with a set screw, is secured to the handle to prevent the hand from sliding down. This swinging motion allows a given amount of agitation to be given to the cream or milk, with less fatigue, probably, than is caused by any other kind of motion, from the relation of the resistance to the muscles which overcome it.

Judging from merely mechanical principles, and from the science of butter-making, it seems to us that this is an admirable churn; and it comes recommended by several of the large dairymen of Vermont who have tried it.

The patent for this invention was issued (through the Scientific American Patent Agency) to Josiah P. Fitch, on Jan. 17, 1860; and persons desiring further information in relation to it will please address H. Carlisle & Co., No. 37 Park-row, this city, or to the same firm at Sheldon, Vt.

MELHUISH'S METAL CAMERA.

It is a characteristic of most useful inventions, that when they are produced, we marvel that they were not thought of before. For upwards of 20 years we have been using cameras of various kinds of wood, which, although very elegant as specimens of cabinet work, have possessed the undesirable qualities of great weight, liability to warping and breaking, and distortion. These objections are felt in their full force, especially in traveling, and in hot climates; to meet which objections the metal camera especially recommends itself. In a comparison between the cameras now in use and the metal camera, we find that when the two kinds are made of equal strength, the metal one, if of brass, is one third lighter in weight, while, if made of aluminium, it will weigh one-sixth of the weight of a wooden camera. Thus, a camera, &c., weighing eighteen pounds, when made of Spanish mahogany, will weigh twelve pounds if made of brass, and three pounds if of aluminium.

With a photographic camera constructed of aluminium the problem so frequently proposed—the lightest possible weight of the traveling artist's baggage—will be solved; while it is evident, that changes of climate, heat or moisture, which, sooner or later, materially damage a wooden camera, can have no effect upon a metal one. Aluminium is a metal that resists oxidation, and is not acted upon by vegetable and mineral acids, with the exception of hydrochloric acid. Besides, it is as hard, ductile, and malleable as iron—qualities that especially recommend it for the purpose to which it is now applied—the construction of a light portable camera.

In manipulation, metal presents many important advantages over wood, the latter material absorbs heat from the sun, and moisture from the wet plates, while metal reflects the sun's heat, and really prevents evaporation. A wet metal plate will keep as well five or ten minutes in a metal slide, as one minute in a wooden one---a great advantage in a hot climate.

The wet collodion slide hitherto in use, generally stains the plate more or less, and the bath solution that drains from the plate gradually rots the slide. Just the opposite result takes place in the metal slide, which being electrotpped with silver, neither affects nor is affected by the nitrate solution of the sensitized plate, but exhibits the rare phenomenon of a negative clean to the edges.

The metal dry plate slide does not effect the sensitive plate, but rather preserves it, the fittings being nearly air-tight. In wooden slides the plate is soon injured by the development of spots, doubtless nuclei of decomposition arising from emanations from the wood. Dr. Norris found that when his dry plates were sent out packed in wooden grooves, they were generally spoiled before reaching the customer.

There is a mechanical feature in Melhuish's metal camera which possesses strong claims upon our admiration: it is, that the metal shutter of the dark side draws *downwards* instead of upwards, thereby preventing the posibility of light reaching the sensitive plate. Under the usual arrangement, the shutter of the dark slide draws upwards, requiring no little care and dexterity, even when covered with a cloth, to prevent the light penetrating and fogging the plate.

The great economy of space presented by the metal camera is not the least of its recommendations. For instance, a stereoscopic camera, for plates $6\frac{1}{2} \times 3\frac{1}{8}$, with sliding front, six double dry plate slides, one wet collodion slide, and a focusing frame, together with a pair of quarter-plate double combination lenses, adapted for taking portraits and views, packs, without taking to pieces, in a leather case, 7 inches long, $3\frac{7}{8}$ wide, and 8 inches deep, and weighs about six pounds: if constructed of aluminium, it would weigh about two pounds. The average thickness of the dark slides, double or single is only $\frac{3}{8}$ of an inch.

By constructing the frame work of the metal camera of suitable strength, to insure rigidity and firmness, the filling-up may be of metal of any degree of thinness, since the purpose it serves is only to exclude the light. in large cameras this filling-up might be of any light material, such as *papier maché*.

In taking stereoscopic views, a metal sliding bar, upon which the camera works, enables the operator to command an angle of 200 degrees.

We consider, therefore, that for certain purposes, the metal possesses advantages over wood. It is probable, however, that for home operations, in the operating room, the wooden camera will continue to obtain the preference, on account of its more showy appearance; even in that case it would be an advantage to have it furnished with metal slides. For out-of-door operations, and for hot climates, there can be little doubt that the metal camera will obtain the preference.—*London Photographic News.*

THE EARLY PLANTING OF POTATOES.—Professional gardeners here adopt a method of producing early potatoes which is probably not as well known as it deserves to be. It consists in allowing the potatoes intended for seed to push forth shoots before they are planted; with this view some early kinds are placed in a layer about three or four inches in depth, in some warm place, such as a stable, on the loft or floor of any out-house, &c. The potatoes are covered with straw sufficient to protect them from frost, and some time in April, or early in May, the sets, each with a robust bud or shoot a couple of inches in length, more or less, are planted in rows about fifteen inches apart, and eight or nine inches from set to set in the rows. With respect to manure, it may either be applied in the usual way under and in contact with the sets, in which case short stable stuff is preferred, but any kind of short manure or compost will answer. The sets, with the shoots retained in an upright position, are covered to the depth of five or six inches with fine mold; and as the plants advance in growth, additional earth is drawn up to them with the hoe. So managed, the crop will be fit for use in June, when the ground from which it has been removed may be cropped with cabbage, turnips, &c. Of course this method is only for securing early potatoes, and they must be protected, with matting, from the late frosts which sometimes take place in May, after severe thunderstorms.