

**FRENCH WHEELBARROWS.**

If a man should arrive in France with but limited respect for wheelbarrows, he would be certainly in the way of conversion from the error of his ways.

Throughout the land things go on two wheels, and the voitures and omnibuses of Paris—all four wheeled—are but a small percentage of the totality. The predominance

Figs. 1, 2, and 3 are made by Paupier, are all of iron, and are sold for 1fr. 10c. per kilo, about 10 cents per pound avoirdupois.

Figures 6 to 9, inclusive, are of iron, are made by Paupier, and sold at the same price as the skeleton barrows, 10 cents per pound.

Figs. 10 to 24 will be easily understood from the descrip-

**Steam Street Cars.**

In Paris very considerable experience has been acquired concerning the use of steam on tramways. Mr. Brown, of Winterthur, made an arrangement with a Paris company last summer, and engines which he has constructed are working daily from the Arc de Triomphe to Courbevoie, a distance of two and one sixth miles. Seventeen are em-

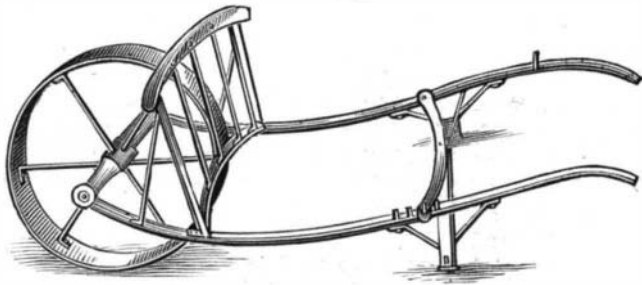


Fig. 1.—Wheelbarrow for Carboys.

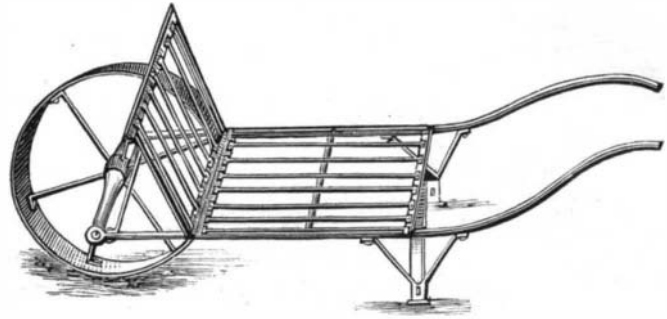


Fig. 2.—Skeleton bed Wheelbarrow.

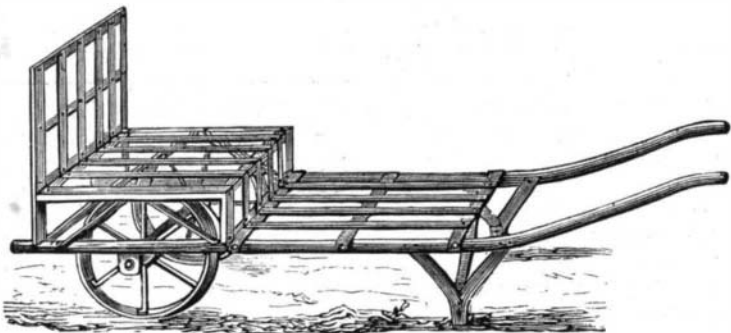


Fig. 3.—Wheelbarrow for Baggage.

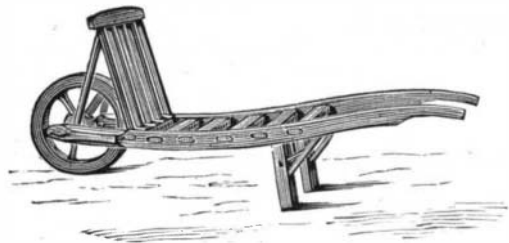


Fig. 4.—Wooden Wheelbarrow.



Fig. 5.—Wheelbarrow for Railway Stations.—(Model of Orleans.)

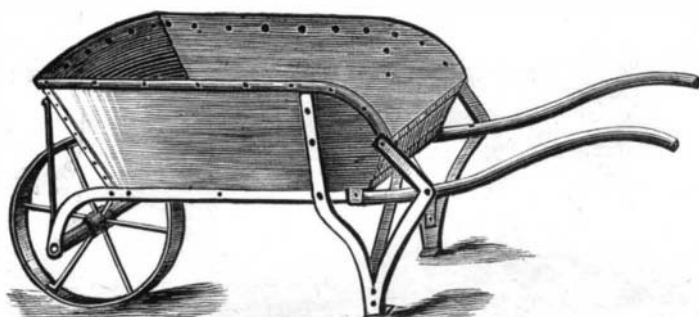


Fig. 6.—Garden Wheelbarrow.

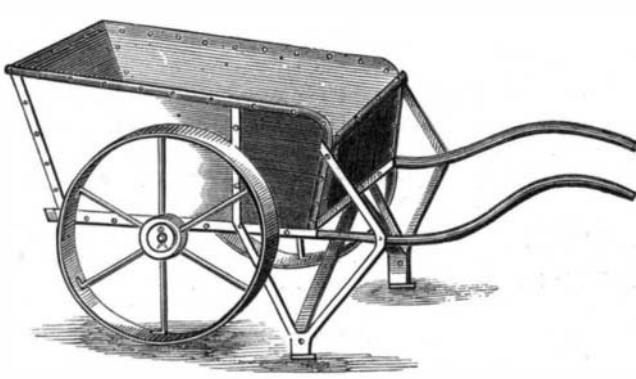


Fig. 7.—Large Box Barrow with two Wheels.

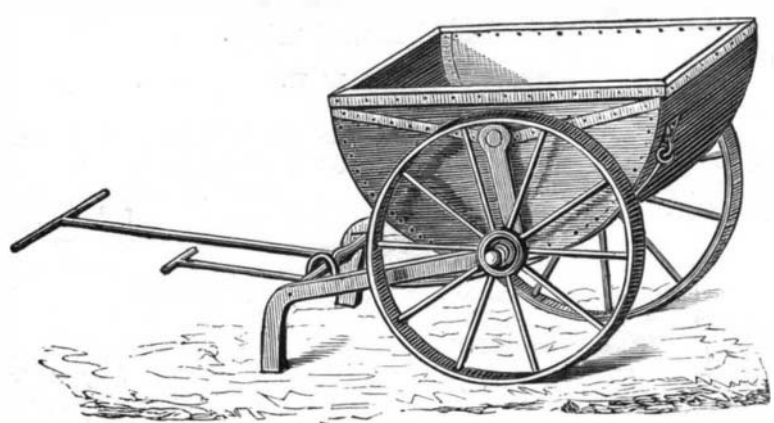


Fig. 8.—Coke Barrow.

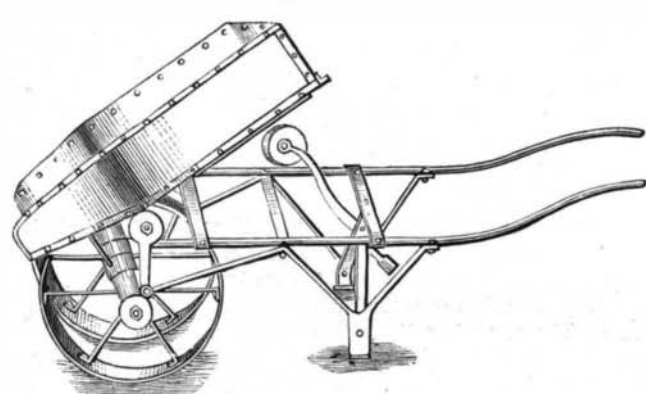


Fig. 9.—Dumping Barrow.

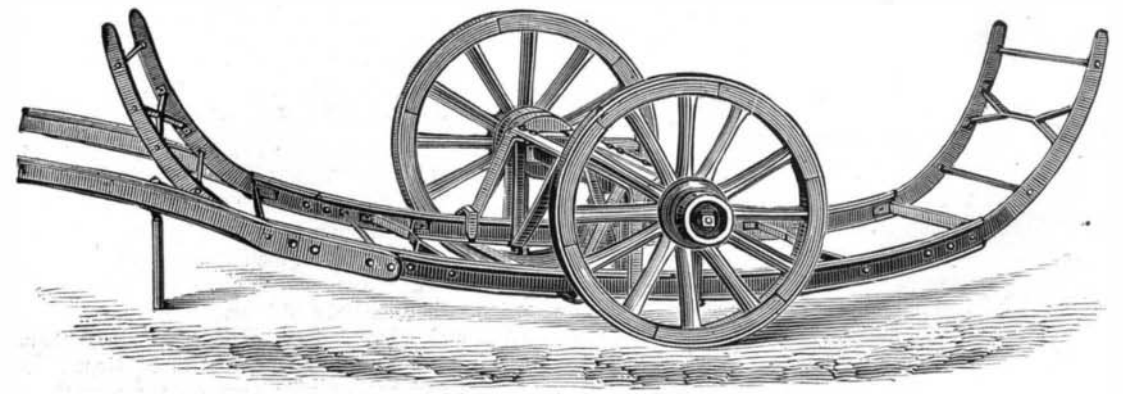


Fig. 10.—Truck for Wood.

of the two wheeled is not alone with the wheelbarrows, but most of the heavy as well as the light hauling is done in carts of various kinds.

It is in wheelbarrows, however, that I am at present interested, and I think our mechanics may see something to admire and perhaps copy. Where shall we begin? With the skeleton. That is a fair foundation or frame for the subject. The different figures will require but little besides the names and purposes for sufficient explication.

tions which accompany the different forms, and in some cases the prices also are given.

Of Fig. 25 it need only be said that the inventor, while abstractedly considering his carboy support, soliloquizes thus:

"It only needs handles and wheels to make a wheelbarrow of it—I think, I think I must add them."

That would make a quarter century of wheelbarrows.

EDWARD H. KNIGHT.

ployed, eleven being in use at one time. They begin to work at 4 P. M., and run till late at night. They usually haul two large tram cars, but on occasion they easily take three cars.

We have recently investigated the working of these engines, says the *Engineer*, and we can say that they are completely successful in a mechanical sense. How far they will be successful in a commercial sense is quite another matter, concerning which sufficient data do not at present exist to enable any decisive opinion to be expressed.

The line falls for a distance of something over a mile from the Arc de Triomphe; a portion of the gradient is, possibly, as steep as 1 in 50; the remainder of the road is nearly level. The tram cars on this route are horsed by a distinct company, and it is this company, and not the owners of the road, who are trying Mr. Brown's engines. The steam cars take their places and work precisely as the horse cars do, and their

up in the water. In fact, Mr. Brown's locomotive approximates in this respect to Lamm's fireless engine, and we have no doubt that he could make a run from Courbevoie to Paris without any fire whatever if steam were once up. The large quantity of water and the high pressure combine to equalize the demands made on the furnace, which requires no forcing. The fuel used is coke, which is carried in small

**Butter Manufacture in Denmark and Sweden.**

At a dairy show recently held in London the subject of butter manufacture in different countries was discussed. Mr. R. Warrington, an able writer on agricultural subjects, tells how the butter makers of Denmark and Sweden produce such excellent quality. Their plan, he states, is to cool the milk as quickly as possible immediately after it is

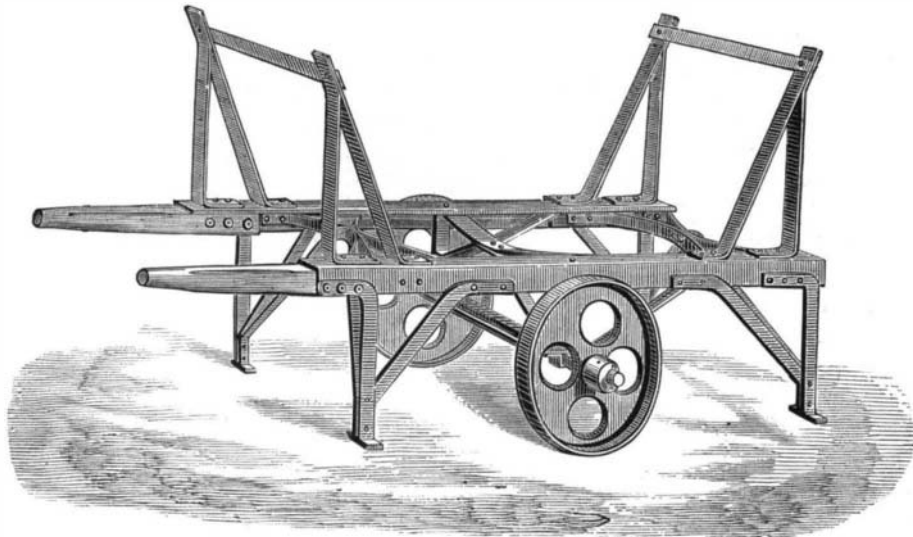


Fig. 11.—Truck for Pig Iron.

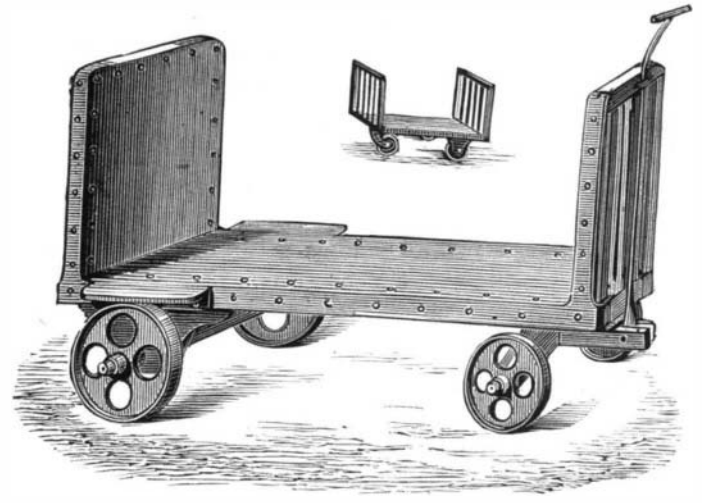


Fig. 12.—Baggage Truck. (Eastern Railway.)

speed is consequently in some respects restricted. We find, however, that the run to and from Courbevoie is made in fifteen minutes, including all stops to take up and put down passengers, or at the rate of eight and two thirds miles an hour. A speed of about sixteen miles an hour can be readily maintained with two fully loaded cars. The average speed of the horse car, including stops, is not more than five miles

bags on the engine. When the furnace requires to be fed, a scoop is fixed in the fire door, and one of the bags emptied into it; the scoop is withdrawn, and the fire door closed. On the run to Courbevoie the steam pressure does not fall at all; on the return trip, which is up hill for half the way, the pressure falls from 180 lbs. to about 165 lbs. The safety valves never blow-off, being, we believe, loaded to about 200 lbs. on the square inch.

received at the dairy. This is effected by means of cold water or ice. The latter is far more effective than water, and admits of constant results being obtained at all seasons of the year, and, in general, cold water is only employed as a partial substitute.

In either case the milk is set in cylindrical pails, the depth of the milk in the pail being about 16 inches, and the most improved form of pail contains about 35 lbs. of milk. The object of making the pail narrow is to facilitate the rapid cooling of the milk. The pails are set in a tank sunk level

As to the cost of repairs, we are unable, as we have explained, to speak positively. We understand that they are



Fig. 13.—Sack Truck. Weight 34 lbs. Price \$4.



Fig. 15.—Truck for Stores.

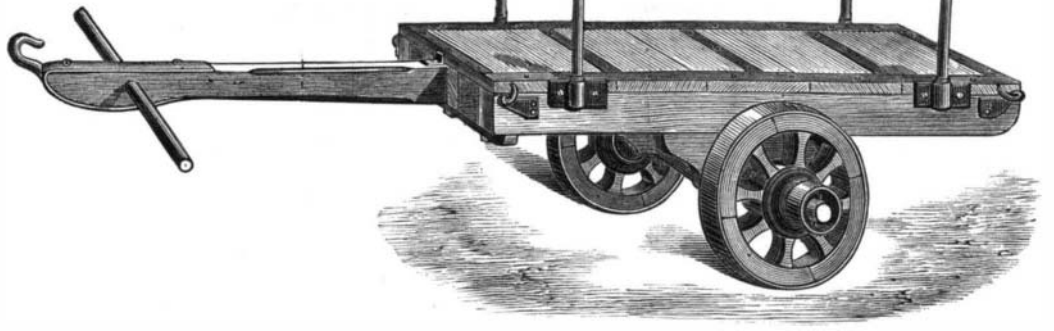


Fig. 16.—Low Truck for Hauling Stone.

per hour. As regards trouble from horses, our experience corroborates that of the engine drivers, who are all picked men, and very intelligent. It is that the horses take no more notice of the steam tram cars than they do of the horse tram cars, that is to say, no notice at all. The engines are perfectly under control. On one occasion, when riding on one of the engines on the run to Courbevoie, the road being clear and a speed of nearly twenty miles having been attained, a man coolly drove a horse and cart across the track within a few yards of the engine. The tram pulled up, however, within two lengths of the engine. After such an experience we have no hesitation in saying that the traffic can be worked as safely with engines as with horses, even at a much higher speed.

There are elements of success about the Brown tramway engine which deserve particular attention. To keep the mechanism out of the dirt, the cylinders and valve gear are placed above the level of the foot plate, and motion is communicated to the wheels by vertical rocking beams, one on each side. In this way the piston rods and slide bars can be kept free of mud and road grit. Various attempts to attain the same end have been made by other persons, but little or nothing was gained by the elevation of the cylinders while the eccentrics were close to the road. Mr. Brown has succeeded in dispensing with the use of eccentrics altogether, and the very peculiar and simple valve gear he employs instead works like a charm, and is exactly the thing for the required purpose. There is little or nothing about it to wear out or to keep in order. Another excellent feature is the boiler, which, considering its size, contains a very large quantity of water. The pressure carried is very great, 180 lbs. to 195 lbs. on the square inch, and the consequence is, that in obedience to a well known law, much power is stored

much smaller than any other type of engine used on the Continent. One engine, at all events, has worked for about eight hours every day for six weeks without any repairs whatever, a wonderful performance for a tram car engine;

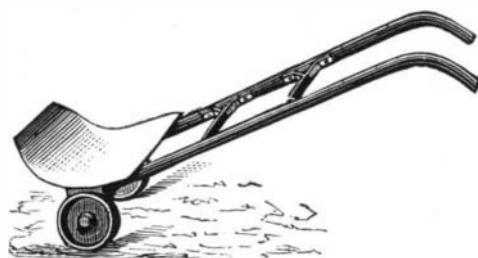


Fig. 14.—Bloom Truck. Iron, 10 cents per pound. Wood, 22 to 28 francs.

and save that a few nuts wanted screwing up and locking in their places, it was in excellent working order when we saw it. The road traversed is in places very bad indeed, and the engines jump in a way to seriously try their springs. The consumption of fuel and of oil is very small, and all things

with the floor, and rest on narrow rafters of wood, so that they do not touch the bottom of the tank, and the water can thus circulate completely round the pails. It has been ascertained that 100 lbs. of milk in a metal pail 14 inches wide, the height of the milk being 16 inches, cooled from 93° to 54° in half an hour; in two hours to 48°; in four hours to 43°; and in ten hours to 36°. The cream is obtained by two skimmings at 24 and 36 hours from the time of setting, and where ice is used the cream is all obtained in 12 to 24 hours. In order to obtain the best quality of butter it is necessary to churn the cream as soon as possible after skimming. When there is not sufficient cream to fill the churn some new milk is added; and the addition of new milk to the cream is generally recommended as improving the flavor of the butter. Sweet cream butter is better and keeps better than sour cream butter, but people accustomed to the flavor of butter made from sour cream are apt to think butter made from sweet cream insipid, so that, in order to suit certain markets, the cream is sometimes soured before churning.

The process of souring is carefully regulated, so as not to exceed the wished for point. When the temperature of the cream is under 60°, souring takes place very slowly, but becomes rapid at a somewhat higher temperature. The cream is warmed, if necessary, by placing it in a metal pail standing in warm water, or by stirring the cream in the tub with a hollow metal stirrer filled with hot water. When the thermometer shows that the cream has reached the desired temperature, the process of fermentation, and the operation of churning commences.

Souring should be so managed that the cream is just ready at the hour of churning, and if the souring proceeds too rapidly, it must be checked by cooling the cream.

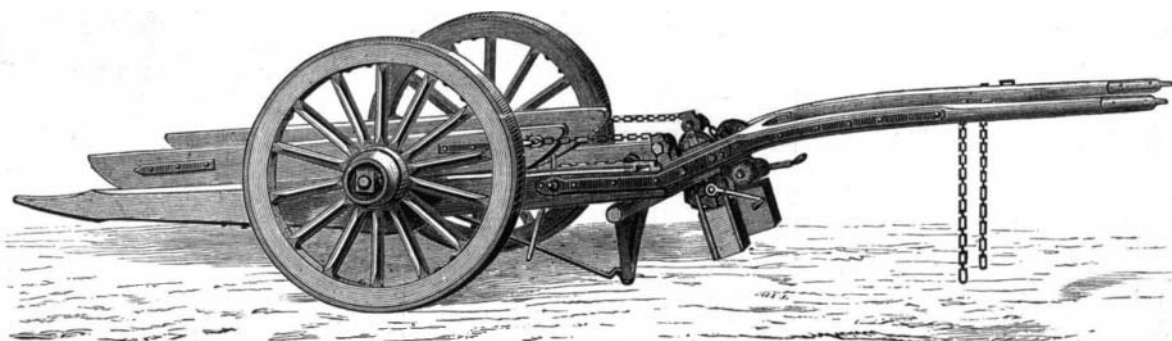


Fig. 17.—Dray with Windlass for Hauling Stone.

considered, we are disposed to think that Mr. Brown has gone at least as near as any other man to solving a very interesting problem. That the public appreciate his efforts is proved by the numbers who travel by the steam worked cars.

The higher the temperature of the cream, the quicker the butter comes, but butter churned at too high a temperature will be more or less greasy in appearance, and the same result is obtained when churning is continued for some time

sary in order to preserve the "grain." After standing for an hour to harden, the butter is put through a machine for expressing buttermilk; care being taken not to overwork the butter, which would render it dry. The butter is next

the sides of the cars, or to the detachable frame resting thereon, a series of cranes, which may be swung laterally when required to support the trucks while discharging their freight. The freight is loaded on the flat floors of the said



Fig. 18. - Bruel's Tub Barrow. Wooden barrel, 50 francs



Fig. 19. - Bruel's Tub Barrow. Iron barrel, 65 francs

after the butter has come, or after the butter is too much worked while being made up after churning. On the other hand, butter churned at too low a temperature will be long in coming, and the product will be hard. It is impossible, however, to fix on any one temperature as the best, since the nature of butter fat varies somewhat at different seasons of the year, and according to the diet of the cow. Generally speaking, sweet cream should be put into the churn at from 50° to 55°, and sour cream from 52° upwards.

Forty minutes is about the time of churning which yields the best quality of butter, but thin cream requires longer churning than thick cream. It is indispensable for uniformity of work that the churn should always be turned at the same speed. The greater the speed the shorter is the time

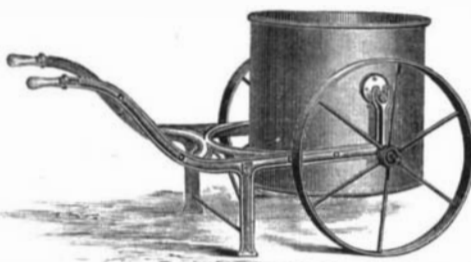


Fig. 20. - Waite, Bunnell & Co.'s Swinging Tub Barrow. Capacities 82 to 225 liters. Price 75 to 180 francs.

truck or false platform in the usual manner, and when the cars arrive at their destination each truck is shifted or moved laterally on the cranes, until all or a part of its pivoted floor sections overhang the side or are clear of the car, when said sections are tilted and the freight discharged.

**Lyman's Trigonometer.**

Referring to the engraving of Lyman's trigonometer, published in our issue of November 2, we would state that Messrs. Heller & Brightly, 33 North Seventh street, Philadelphia, are the manufacturers, who supply the instrument.

**The Black Spot on Jupiter.**

In reply to the question of Mr. Eadie (SCIENTIFIC AMERI-

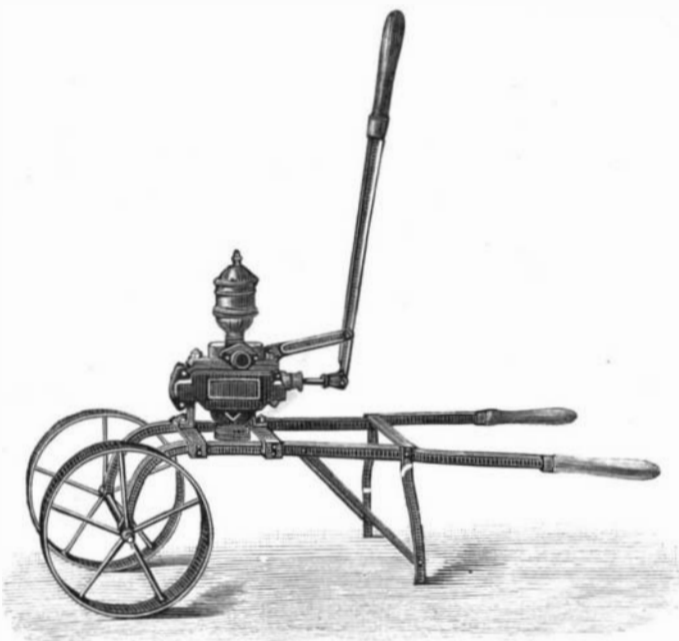


Fig. 21. - Beame's Pump Barrow. Horizontal Action. Capacity 2,500 liters per hour. Complete with Suction and Discharge Pipes, etc. 126 francs. Capacity 5,000 to 8,000 liters per hour, 215 francs.

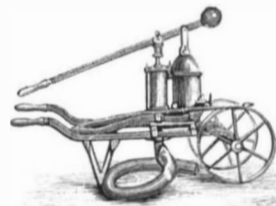


Fig. 22. - Garden Pump or Barrow. Vertical Action. Price complete 115 francs.

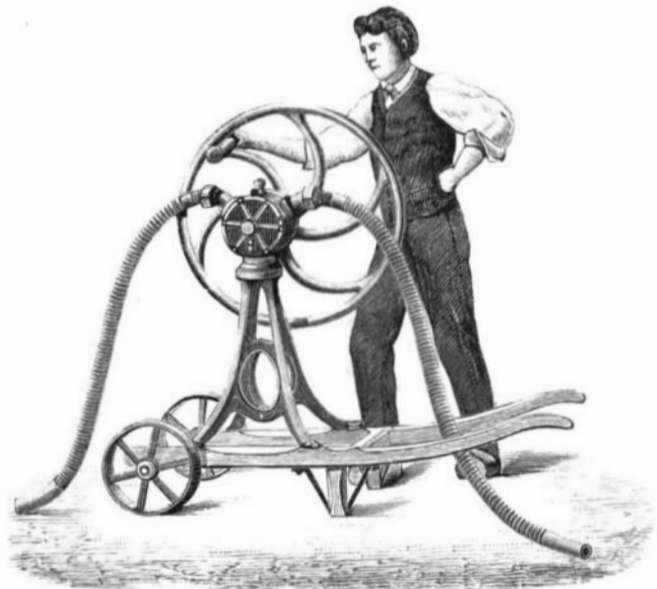


Fig. 23. - Rotary Garden Pump. Capacity 2,000 to 9,000 liters per hour. In bronze from 195 to 430 francs.

of churning, and in a wide churn a slow speed has the same effect as a higher speed in a narrow churn. The number of revolutions is easily ascertained by attaching a short piece of string to the spindle of the churn and counting how often it comes round in a quarter of a minute. The churning should be stopped as soon as the butter appears, as overchurning injures the quality of the butter. When the butter is taken out of the churn it is pressed lightly together by hand. Sweet cream butter is never washed; sour cream butter is slightly washed in some dairies, but this is not general. Color is artificially given to butter by mixing some

weighed, and after standing a couple of hours is again passed through the machine. Salt, at the rate of 3 lbs. to the 100 lbs., is added to the butter while going through the machine either at the first or second time of rolling. The butter when made is immediately packed into casks, the sides of which are slightly salted. Large quantities of sweet cream butter are exported from Denmark in tins to tropical countries, and it is stated that the great care taken to preserve the "grain" of the butter has the effect of raising its melting point, so that such butter remains solid in a hot climate.

The system described by Mr. Warrington, says the *Irish Farmer's Gazette*, is considered by him to have so many advantages that it will undoubtedly become the method of the future. It is being largely adopted in the United States, and is under trial in several parts of Europe.

**New Agricultural Inventions.**

An improved Plow, adapted to the various kinds of work necessary in the cultivation of cotton and other crops, has been patented by Mr. Benjamin H. Cross, of Cabaniss, Ga.

An improvement in Stump Pullers has been patented by Mr. William A. Webb, of Wadley, Ga. This invention consists in two supports, having notches formed in their upper ends, and a cylinder provided with journals upon its ends, and having a mortise formed in it for receiving the operating lever. A chain is connected with the cylinder and attached to the stump. When the cylinder is turned by means of the hand lever a great leverage is secured.

An improved Dumping Car has been devised by Mr. Louis Prince, of Nashville, Ohio. This invention applies to the cars, or to a detachable frame resting thereon, a truck or wheeled false platform, which is capable of being shifted laterally, and has a series of tilting floor sections or traps, on which the freight is deposited; there are also hinged to

CAN, October 26), as to the cause of the black spot observed by him on the disk of Jupiter, September 28, Mr. R. D. Schimpff writes that it was unquestionably the shadow of



Fig. 24. - Rotary Pump on Iron Frame. Capacity 2,000 to 3,000 liters. Price 160 to 240 francs.

"butter color" with the cream when it is put into the churn.

The retention of some buttermilk is believed to be neces-



Fig. 25. - Carboy Support

one of Jupiter's moons. The satellite had completed its transit, but its position was such that its shadow still rested on the planet at the hour named.