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## Improved Coffee and Grain Dryer.

We this week illustrate a new machine, invented by José Guardiola, of Chocóla, Guatemala, Central America, for artificially drying grain, coffee, malt, etc., so as to prepare it for preservation, transportation, or other purposes. It is more particularly intended to supersede the common method of drying such articles by exposure to the sun, by materially hastening the evaporation of the surplus moisture. It consists of a new arrangement of cylinders, hot air tubes, etc., for drying the grain, and a new construction of furnace for heating the air.

In Fig. 1, A shows the frame of the machine, which serves as a support for two inclined perforated cylinders, B and C. The cylinder, B, is so placed that its lower end is above the upper end of the cylinder, C, and they are there connected by a fixed neck or conduit, as seen in the engraving. The cylinders are supported on small rollers having their supports in the frame, by which means they can be readily revolved around their axes. Rotary motion is imparted to them by a worm gear working in toothed wheels attached to them, one of which is shown at B. Each cylinder contains an inner perforated tube, which is shown in section in Fig. 2, where D is the outer shell of the cylinder and E the contained tube. It will be seen that, between the inner tube and outer shell, there are radial partitions dividing the cylinder into segmental compartments. From these partitions, transverse plates project into the compartments and carry, at some of their ends, wings which are turned alternately inward and outward, as shown in the figure. The partitions and their appendages extend the whole length of the cylinders. The inner tubes of the two cylinders are coupled so that they remain free to revolve with the two hot air flues which project from the heater, F, as shown in Fig. 1. G is an elevator for raising the grain to be dried to the requisite height; it has one spout extending from the upper part into the open end of the cylinder, B, and another leading downward to a suitable receptacle for the grain. A valve is arranged so as to open whichever spout is to be used, and to shut off the other. From

fed into a vibrating shoe, which empties into a spout leading to the elevator. The heating apparatus, F, has a fire chamber, in which a tubular grate and additional vertical tubes connect the hot air chamber with a cold air supply chamber underneath. The fan, I, supplies the cold air to the supply chamber, whence it passes through the tubes and reaches the hot air chamber, thoroughly heated.

The operation of the machine is as follows: The grain to

The invention was patented through the Scientific American Patent Agency, May 7, 1872. For further information Mr. Guardiola may be addressed, care of Ribon & Muñoz, 63 Pine street, New York, or care J. C. Merrill & Co., 204 California street, San Francisco, Cal.

## Solvent for Coralline.

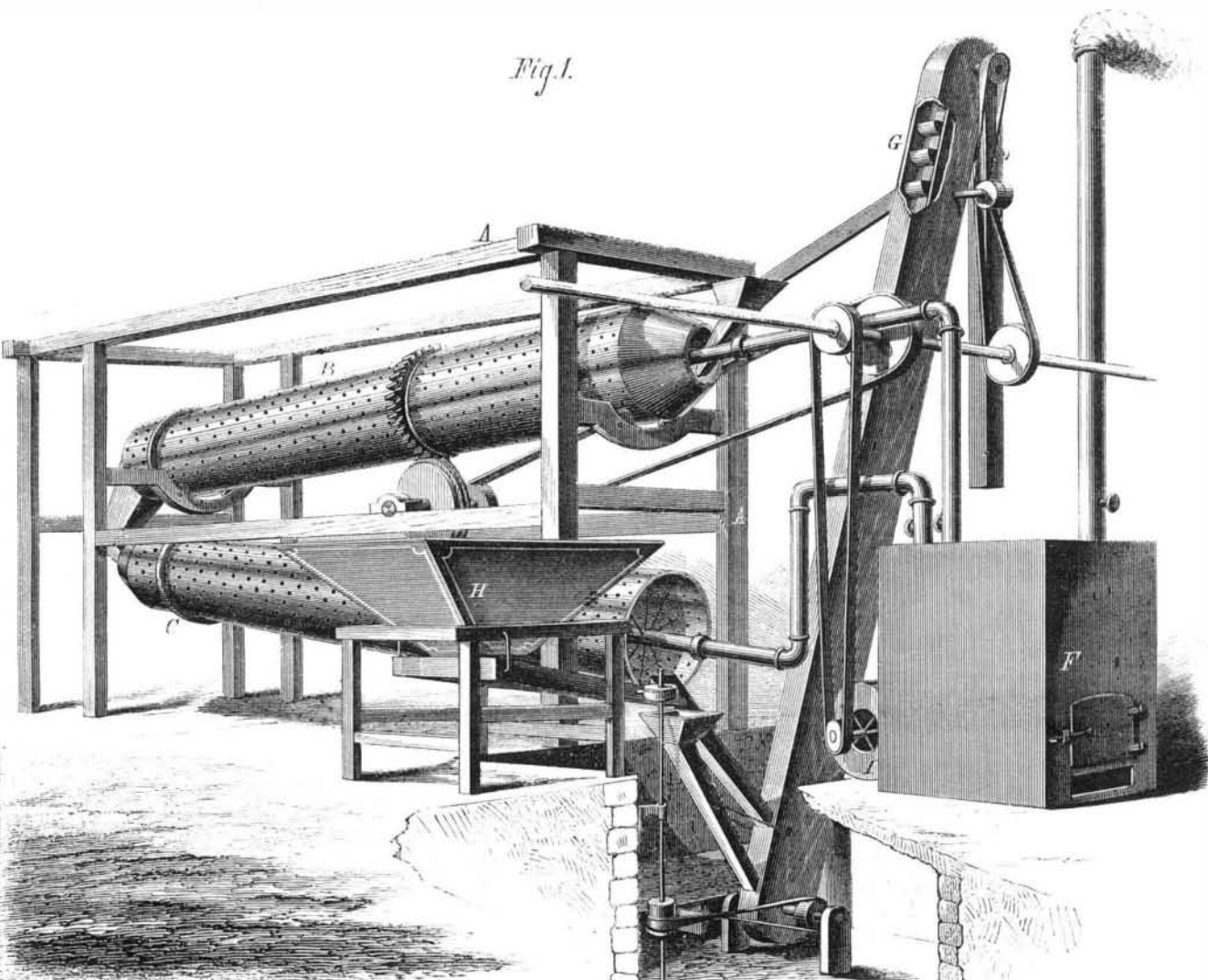
The solubility of coralline in an alkaline liquid suggested the propriety of employing soluble glass (basic silicate of soda) which has necessarily always an alkaline reaction, and by the use of which there might be expected to result a compound sparingly soluble in water. The experiment proved successful. Larger or smaller quantities of coralline were dissolved in a boiling solution of one part of soluble glass of a sirupy consistence, previously diluted with four parts of water. Thus were obtained solutions which gave stains ranging from the most delicate rose to the most brilliant carmine. They are well suited for dyeing light colored woods containing but a small amount of tannin, such as Scotch fir, pine, lime, willow, etc. These, without injury to the color, may be subsequently varnished and polished. The same process may be applied to paper intended for the manufacture of artificial flowers, and for a variety of ornamental purposes. These solutions can only be preserved one or two days in a state fit for use. If allowed to stand longer, the silica separates itself out from the soluble glass, the solution

gelatinizes, and the color loses its solidity and fire. The tar colors, known in commerce as ponceau, soluble in cold water and solutions of soluble glass, form beautiful red liquids, like that yielded by coralline. These, even after long standing, do not deposit their silica, and can therefore serve to prepare a brilliant red ink. Aniline yellow and vesuvine, on the other hand, are less soluble in soluble glass than in water.

## GUARDIOLA'S PESTLE FOR HULLING COFFEE, RICE, ETC.



Our engraving shows a novel form of pestle to be used in hulling rice, coffee, etc., either by hand or machinery. It is



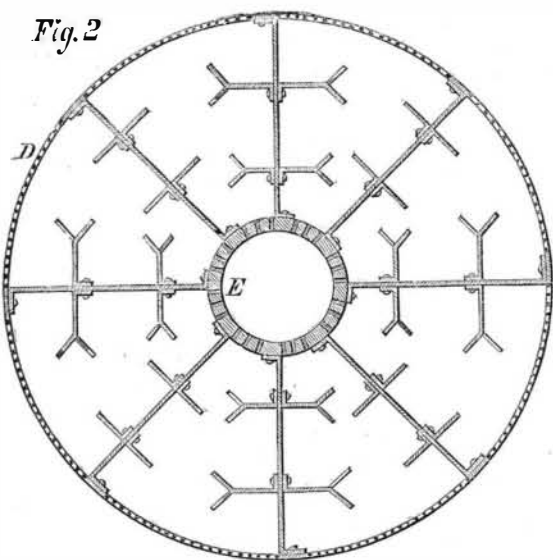
GUARDIOLA'S COFFEE AND GRAIN DRYER

be dried is conveyed from the hopper over the vibratory shoe to the lower part of the elevator, and thence to the upper end of the cylinder, B. Within this cylinder, it is distributed through the compartments and gradually conveyed to the lower end, from which it passes through the stationary neck into the cylinder, C, where it is again agitated and moved along, while within the cylinders the grain is constantly subjected to the action of the heated air which passes from the perforations in the contained tubes into all the compartments and out through the outer shells. If, after having passed through the cylinder, C, the grain should not be dry enough, it may be reconveyed to the elevator and passed again through the machine, and this may be repeated as often as is necessary. When the required degree of dryness is obtained, the grain is finally discharged through the proper spout into a receptacle provided for it. The cylinders may be revolved five or more times in a minute, or slower, according to the requirements of the case. The temperature in the cylinders is ascertained by a thermometer, and regulated by the quantity of fuel supplied to, and the use of dampers in, the heating apparatus. The complicated motions, given to the grain by the partitions, plates, and wings, cause it to travel a distance of about three miles in an hour, and the evaporation goes on rapidly. Coffee, which contains fifty per cent of water, takes from eight to ten days to dry in the sun; it dries in less than twenty-four hours in this machine. Grain would dry in one or two passages through the cylinders.

Mr. Guardiola is an extensive coffee grower, and has invented other machines of great practical value in curing coffee and like products of Central America. We have been favored with a generous sample of coffee from the Chocóla plantation, worked by Mr. Guardiola, and can personally testify to the plumpness of the berry and its fine flavor when cooked.

We notice elsewhere a coffee huller invented by this gentleman, and we shall present engravings and descriptions of other inventions pertaining to the same industry, from the same source, in future issues.

Fig. 2



the lower part of the cylinder, C, a spout leads into the lower part of the elevator. H is a hopper, from which the grain is

the invention of José Guardiola, of Chocó, Guatemala, and was patented by him through the Scientific American Patent Agency, April 30, 1872.

The invention consists in making the pestle, which is conical in form, with projecting ribs of various lengths, thereby forming grooves, in which the grains work their way upward by friction, and are thus divested of the external husks of pellicles it is desired to remove.

The pestle is operated by moving it up and down in the mass of grains to be hulled. The grains are thus crowded into and through the grooves, which, it is claimed, acts effectively to speedily accomplish the hulling.

#### FROM THE ATLANTIC TO THE PACIFIC.

A recent number of *Harper's Magazine* contains the following interesting description of the cars used on the Pacific Railway:

"From Chicago to Omaha, your train will carry a dining car, which is a great curiosity in its way. I expected to find this somewhat greasy, a little untidy, and with a smell of the kitchen. It might, we travellers thought, be a convenience, but it could not be a luxury. But in fact it is as neat, as nicely fitted, as trim and cleanly, as though Delmonico had furnished it; and though the kitchen may be in the forward end of the car, so perfect is the ventilation that there is not even the faintest odor of cooking. You sit at little tables which comfortably accommodate four persons; you order your breakfast, dinner, or supper from the bill of fare which, as you will see below, contains a quite surprising number of dishes, and you eat, from snow white linen and neat dishes, admirably cooked food, and pay a moderate price.

"Beyond Omaha, unless you have taken seats in a hotel car, you eat at stations placed at proper distances apart, where abundant provision is made, and the food is, for the most part, both well cooked and well served. These hotel stations are under the supervision and control of the managers of the roads, and at many of them, especially on the Central Pacific road—in California, that is to say—your meals are served with actual elegance. Sufficient time is allowed—from thirty to thirty-five minutes—to eat; the conductor tells you beforehand that a bell will be rung before the train starts, and we always found him obliging enough to look in and tell the ladies to take their time, as he would not leave them.

"There is a pleasant spice of variety and adventure in getting out by the way side at the eating stations. We saw strange faces, we had time to look about us, the occasional Indian delighted the children, we stretched our legs and saw something of our fellow passengers in the other cars. Moreover, if you have a numerous party desirous to eat together, the porter will telegraph ahead for you to have a sufficient number of seats reserved; and thus you take your places without flurry or haste, and do not have your digestion spoiled by preliminary and vexatious thoughts about pushing for a good place. In short, these trains are managed for the pleasure and accommodation of the passengers. The voyage would, I suppose, be unendurable else.

"The sleeping car, but for which the journey to the Pacific by rail would be extremely uncomfortable, but by whose help it is made a pleasure trip, owes its development and perfection to Mr. George M. Pullman, who is the inventor and patentee of most of the ingenious devices by which the traveler's comfort is secured in these cars. Of course he is an American. He began life poor, was once a miner in Colorado, and was, I believe, so poor when he began the experiment of his sleeping cars that it was with great difficulty he raised the means to build his first car. He is now president of the Pullman car company, which has five hundred sleeping, drawing room and hotel cars on different railroads, and is building more, at the rate of three finished cars for every week of the present year. The company is also building a new kind of day cars, to be put on such short routes as that between New York and Washington; and by the time you are reading this, it will run a daily hotel car from Chicago to Ogden, in which you may sit and sleep, and have your meals served at any time you may choose to order them. It is planning, and will fit up this year near Chicago, extensive car works of its own on grounds large enough to contain also the cottages of the thousand workmen who will be there employed; and it is said that these grounds are to be planned with special regard to the convenience of the men and their families. The company has already found it expedient to keep and furnish, near the depots in all the great cities, rooms where conductors or porters may, at the end of a journey, bathe, change their clothes, make out their reports, and read, write, and amuse themselves. Mr. Pullman thinks that, as he requires much from his men, and as they are picked men, trained with care, it is an advantage to the company to furnish them such a home at the ends of the routes of travel, where they make themselves comfortable and at ease. Certainly it is a humane thought and likely, besides, to give him the command of responsible servants.

"The Pullman cars are constantly improving. The Russian Grand Duke traveled last winter in perhaps the most commodious and perfect manner in which any one ever traveled by rail. He had in one train a day car, in which he and his companions could sit at ease, read, write, or amuse themselves as in a parlor; a dining or hotel car, into which they passed to breakfast or dinner; and a sleeping car. No doubt the impressions he got of this kind of pleasure traveling will facilitate Mr. Pullman's entrance into Russia, where, as well as in England, Germany, and France, the Pullman company will within two years have placed their cars, as arrangements are now making for that purpose.

"The superiority of the American sleeping cars is in their

cleanliness, the perfection of their heating and ventilating contrivances, and the presence of everything which can make a car convenient to live in. There is nothing like them in Europe, and all European travelers in this country have been surprised and delighted with them. The Pullman company is successful, as it deserves to be. It now runs cars on nearly one hundred roads, the railroad companies generally owning one half the stock of the cars they use, and thus having a mutual interest. The Pullman company sells to the public what the railroad company in such cases does not furnish—the sleeping car accommodations. You may now ride in Pullman cars over sixty thousand miles of railroad. The Pullman company already employs over two thousand persons, and in its new car shops will employ one thousand more; and all this vast business has grown from the smallest beginnings.

"One of the pleasantest ways to travel across the continent, though not, I think, the way in which you will see most of the people, is to make the journey with a party of friends numerous enough to fill or nearly fill, a car. To show you at what cost—exclusive of the regular railroad fare—such a company may journey, I give you here some extracts from a little book issued, for the information of travelers, by the company:

"For a regular sleeping car, containing twelve open sections of two double berths each, and two state rooms of two double berths each, (in all twenty-eight berths,) with conductor and porter, seventy-five dollars per day.

"For a drawing room car, containing two drawing rooms having each a sofa and two large easy chairs by day, and making up at night into two double and two single berths, three state rooms having each two double berths, and six open sections of two double berths each, (in all twenty-six berths) with conductor and porter, seventy-five dollars per day.

"For a hotel car, containing two drawing rooms, as above described, one state room, having two double berths, and six open sections of two double berths each, (in all twenty-two berths,) (and having, also, in one end, a kitchen fully equipped with everything necessary for cooking and serving meals, with conductor, cook, and two waiters, eighty-five dollars per day.

"The Pullman hotel car is one of the most ingenious, as well as the most convenient, of modern arrangements for travel. It can seat forty persons at the tables; it contains not only a kitchen—which is a marvel of compactness, having a sink, with hot and cold water faucets, and every modern convenience—but a wine closet, a china closet, a linen closet, and provision lockers so spacious as to contain supplies for thirty people all the way from Chicago to the Pacific, if necessary; its commissary list contains, as I ascertained by actual count, 133 different articles of food; it carries 1,000 napkins, 150 table cloths, 300 hand towels, and 30 or 40 roller towels, besides sheets, pillow cases, etc., etc. And unless you are of an investigating turn, you would never know that the car contained even a kitchen.

"Whenever a sleeping car arrives at the end of a journey, it is laid over for twenty-four hours. Thereupon the porter gathers up the soiled linen for the laundry, and a force of men and women enter the car and take out of it bedding, carpets, and every movable thing; all are beaten with rods and hung up to air; and meantime the whole car is aired, and the woodwork dusted, rubbed, and scrubbed in the most thorough manner. This is the manner of their housekeeping."

#### The Hartford Steam Boiler Inspection and Insurance Company.

The Hartford Steam Boiler Inspection and Insurance Company makes the following report of its inspections in the month of April, 1872:

During the month, 823 visits of inspection were made, and 1,652 boilers examined—1,605 externally, and 563 internally—198 were tested by hydraulic pressure. Most of these latter were new boilers, in the yards of boiler makers, which we were called to examine previously to their being put in use. Number of defects in all discovered, 1,264, of which 286 were regarded as dangerous. Many of these boilers were in iron works, furnaces, and rolling mills, and were operated by the waste heat, which is often very severe in its effects on boilers. Furnaces out of shape, 51—3 dangerous; fractures in all, 164—65 dangerous. These cases were found mostly in boilers that had been used for some years and overworked, or in those which had accumulated quantities of deposit, and which were badly scaled. Burned plates, 82—29 dangerous; blistered plates, 137—21 dangerous; cases of sediment and deposit, 166—28 dangerous; cases of incrustation and scale, 200—27 dangerous; cases of external corrosion, 79—25 dangerous; cases of internal corrosion, 36—5 dangerous. Internal corrosion is usually the result of impure feed water. Water in and about chemical works is very bad indeed, and such boilers should be fed from streams or pools having no connection whatever with the works. \*We have of late been obliged to condemn the boilers of a large manufactory of this kind, because, upon examination, they were found in a very dangerously corroded condition. When the feed water for boilers cannot be obtained from sources that are pure, that is, free from acids, carbonate of soda has been found beneficial, and is used quite extensively in England. Cases of internal grooving, 47—10 dangerous; water gages out of order, 40—6 dangerous; blow out apparatus defective, 30—5 dangerous. One great trouble with this last fitting is that it is often partly imbedded in brick-work; the valves and connections are poor or defective, and the result is they leak, and the water in the boiler is found to be low, when the real cause is not understood. Hence the

pipes which connect blow out cocks to the boilers should be easily accessible, and in no case should they be imbedded in masonry. Safety valves overloaded and defective, 31—23 dangerous; boilers without gages, 10—7 dangerous; pressure gages defective, 76—17 dangerous, varying from —10 to +7. Cases of deficiency of water, 7—2 dangerous; broken braces and stays, 44—15 dangerous; boilers condemned, 13.

#### Artists with Bad Eyes.

Rarely, perhaps never, has the skill of the surgeon been demonstrated in such an interesting manner as in the recent artistic researches of Mr. Liebreich. This eminent ophthalmist has lately been lecturing at the Royal and London Institutions on the effect of certain faults of vision on painting, with especial reference to the works of Turner and Mulready. His lectures have excited much interest, especially among artists and art patrons. And his lucid, carefully elaborated demonstrations, which he enforces with almost mathematical precision, lead the great majority of his hearers to the conclusions which he has formed. Mr. Liebreich truly says that many connoisseurs elevate the faults in Turner's paintings into peculiarities of style, and some would even go so far as to form a school to imitate that style. Turner's earlier paintings were not disfigured with the haziness and falsity of proportion which marked his later productions; and these faults the lecturer exactly reproduced to his audience by throwing a landscape or a tree on the screen, and then by interrupting the rays between the picture and the reflection by a lens so constructed as to diverge them to such extent as, according to this theory, they were diverged in the case of Turner. Turner's defect of vision was what is known as "astigmatism," that is, the vertical rays and the horizontal rays of light were not brought to his sight at exactly the same focus. Hence arose the vagueness and incorrect proportions we have referred to. Turner painted from Nature exactly as Nature appeared to him, but not as it appeared to him when his sight was truthful. Mulready's defect was a yellowness in the crystalline lens of the eye, which came on with age, and which occasioned a comparative failure of perception of blue colors. The result was that the artist added his blue tints much too extravagantly, and presented ploughboys in smock frocks as though they had been clothed in purple. Mr. Liebreich's opinions are endorsed by many of the ablest scientific and artistic authorities, and, as we said, seem to be conclusively established by his arguments.—*Chemist and Druggist.*

#### Expeditions to the North Pole.

According to advices from Stockholm, the projected north polar expedition, under the control of Professor Nordenskiöld, is almost ready for sea, and Swedish geographers entertain great hopes of success for the new undertaking. The expedition will have on board, besides Professor Nordenskiöld, Lieutenant Palander, of the Swedish navy, who has already had some experience in polar exploration, having accompanied the Swedish expedition of 1868; also a physician, a physicist, and several other servants, who will accompany the expedition for the summer, returning from Spitzbergen in the autumn; making in all, with the crew, twenty persons. The principal object of the expedition, which is not expected to return before the summer or autumn of 1873, is to reach the pole from high latitudes by means of sleighs drawn by reindeer—an enterprise in which the German geographer, Dr. Petermann, of Gotha, does not place much faith. The expedition will take with it from Gothenburg a portable house, of nine rooms and kitchen, which is to be put up on the Seven Islands, in 80° 38' northern latitude—the most northern point at which an expedition has ever wintered in these regions. Great importance appears to be attached by Professor Nordenskiöld to the cargo of fifty reindeer, which he will ship from Norway, together with the necessary fodder and a number of Lapps to attend them.

Dr. Petermann and the great majority of the German geographical societies have given their entire support to the new Austrian expedition, which is to sail from Bremerhaven about the end of June, and which Dr. Petermann greets as "the greatest event in the history of modern arctic explorations." The object of the Austrian expedition will be the farther navigation of the ice-free ocean which they met with last summer to the east and north, and the exploration of the arctic ocean to the north of Siberia. The plan of the voyage is as follows: The expedition being provisioned for a period of three years, the first winter is to be spent on Cape Tschelinskin, the most northern promontory of Asia; during the second summer the exploration of the central polar ocean is to be continued, and an effort made to reach the pole; the second winter will be spent on the new Siberian island, and the third summer will be employed in reaching Behring's Straits and an Asiatic or American haven. The Austrian expeditionary vessel is a three masted schooner, 118 feet long, 25½ broad, 13½ deep, provided with an effective engine of 95 horse power, and coals for forty days.

A TABLESPOONFUL of quicksilver was lately found in an old grave in York county, Pennsylvania. It is supposed to have been buried there in the shape of calomel within the patient.—*Exch.*—[In old times, the doctors sometimes administered pure mercury as a medicine; a more common form of mercurial administration was the blue mass. Either of these preparations would account for the presence of quicksilver; but dosing with calomel would not.—Eds.]

By a single blast of nitro-glycerin, at the Hoosac tunnel, North Adams, Mass., the rock was blown out in the center of heading to a depth of eight feet ten inches.