Chemically Pure.

A writer in the *Chemiker Zeitung* discusses the question of what is understood by chemically pure (C. P.) as follows:

In the smaller chemical manufacturing industries the following degrees of purity are recognized: 1. Technical (commercial). 2. Pure, purified, purum. 3. Chemically pure, purissimum. These terms are used to distinguish different grades of the same article, without, however, referring to any absolute standard of purity. In explanation of this he mentions a few examples:

By technically pure goods are understood such as are obtained by the customary manufacturing methods without any further purification, and are pure enough for most technical purposes; adulterations are, of course, not permissible. Technical (or, as we say in this country, the commercial) caustic ammonia made from gas water must not contain any sulphur, while chlorine contained in the water used is permissible, and so is a trace of tarry matter. Red lead made from ordinary soft lead is *commercially pure*, but if it is mixed with brick dust it is not pure. Chili saltpeter as imported from South America with 95 to 98 per cent of real soda saltpeter is commercially pure.

Under pure, purified, *purum*, we understand such goods as contain no gross impurity. They are generally made from the commercial article. Recrystallized Chili saltpeter is called *pure*, although a slight turbidity is produced in the solution by silver nitrate as well as barium chloride, indicating chlorides and sulphates. Commercial zinc free from arsenic is called *purum*.

The goods designated as chemically pure, *purissimum*, are the purest that are made in that particular factory and kept on sale, although it very rarely happens that they are chemically pure in the strictest sense of the word. Chemically pure ammonia must neither contain chlorine and chlorides, nor yet decolorize the solution of potassium permanganate. The solution of chemically pure soda saltpeter must not give any reaction with silver nitrate or barium chloride. Chemically pure nitric acid must stand the same test. Chemically pure zinc is obtained by distilling what is called pure zinc.

Products that are in fact absolutely pure cannot be afforded at the ordinary price. When such are required, a special bargain must be made. The best way to do when very pure reagents are needed for special purposes is to prepare them yourself. In most cases you can use those of well known makers that are marked C. P. It may happen that in special cases some particular impurity would be objectionable, and in such cases it would be advisable to state this in ordering.

Kahlbaum's Berlin style is highly commendable, of stating on the price list what are the chief impurities.

In this country we may classify many chemical products as follows: Medicinally pure, chemically pure, photographically pure.

For example, potassium bromide for medicinal purposes may contain 1 or 2 per cent of the chloride, and as much carbonate. For chemical purposes the carbonate must be removed and all but a trace of chloride, while in photography even a trace of chloride may prove objectionable. A curious case once fell under our observation, where a quantity of uranium oxide, purchased for chemically pure from a well known manufacturer, was found to contain so much of another and more valuable substance, that the adulterant was of more value than the principal substance.

In all cases where the presence of any particular contamination would be very objectionable, the user should always test for it himself and not trust to another, unless, as sometimes happens, he is not skillful enough to do so.

Black Walnut.

Black walnut can be grown from the nut, producing a butt fourteen inches in diameter in as many years from the the seed, as far north as Massachusetts. No tree valuable for its timber in cabinet uses, unless the black birch be so considered, can attain to that useful growth in that period of time in our northern climate. Maples require twenty years before they become good timber trees; beeches and birches, fifteen years to attain to a diameter large enough to yield nine-inch boards; hickory should have a growth of thirty years; and cherry at least as much.

The cultivation of the black walnut might be made a source of profit, if only as an auxiliary to the ordinary farm products. It requires no particular care, makes an elegant tree even in its youth, and later offers an agreeable shade. The *Sewing Machine Journal* says:

"One hundred acres of land, seeded to walnut trees, if they even reach maturity in fifteen years, would be more remunerative than many of the crops produced by fifteen of incessant toil. Besides, these trees might be planted and would thrive on spots which are really valueless for agricultural purposes, and while in the course of growth would serve as valuable aids to agriculture as wind breaks and in other respects."

CALIFORNIA'S vineyards are rivaling her mines as a source of profit.

AUTOMATIC FREIGHT CAR BRAKE.

Among recent inventions is that of an automatic freight car brake, patented by Mr. William A. Wilde, of Chicago, Ill., which obtains its power by the compression of the draw bar spring. This spring is inclosed in the cast iron box, E (Fig.

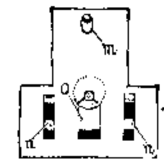

Fig. 2.—LOCK PLATE D.

1), which is provided with a hole in the center of the forward end and with a long slot in the side. On each side of the rear end of the draw bar is a wedge, shown at K. The plate, D (Fig. 2), has a vertical movement within guides fastened to the sides of the cast iron box and to the floor timbers of the

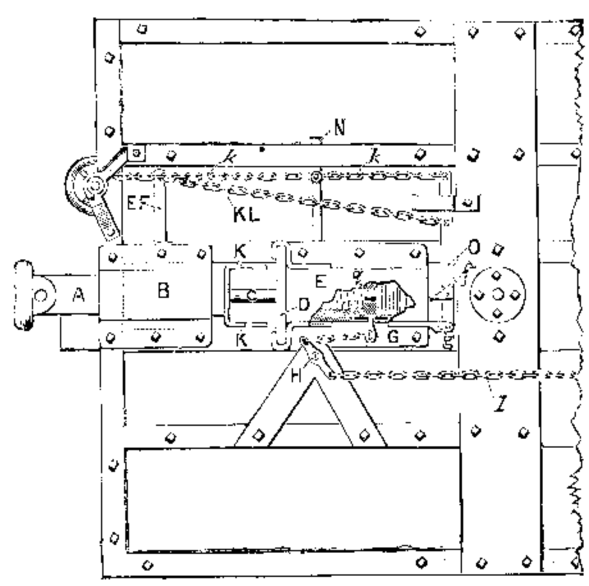

Fig. 1.—PLAN SHOWING BOTTOM OF CAR INVERTED.

car, and is perforated by the rectangular slots, *o n*, near its lower extremity, and with the slot, *m*, near its upper. The draw bar bolt, *c*, passes through the draw bar spring and the slot, *o*, in the plate, and connects the draw bar, A, with the follower *q*, which is connected by the pin, G, passing

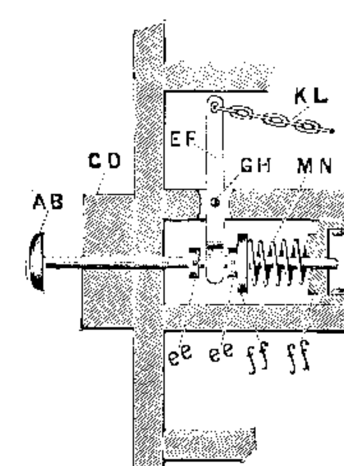

Fig. 3.—REVERSING APPARATUS.

through the slot in the box with the brake chain by means of the lever, H. The bolt, C, Fig. 4, is reduced about one-half its diameter along a small portion of its length, thus forming a recess or neck, as shown at X. The lever, O (Fig. 1), has its fulcrum at *g*, and is provided with a projecting branch, *f*.

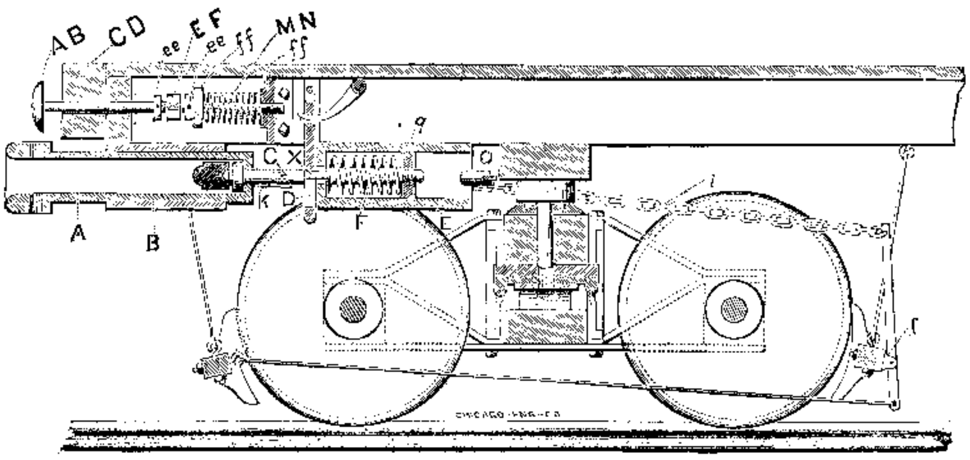

Fig. 4.—VERTICAL SECTION WITH DRAW BAR PULLED OUT.

The operation of the mechanism above described is as follows: When the locomotive moves it pulls the draw bar out and with it the rod, C (Fig. 4), and follower, *q*, thereby compressing the spring, F. This action brings the neck of the rod within the slot, *o*, of the plate, causing the latter to drop of its own weight to find a support in the small end of the slot, thus holding the spring compressed and releasing the brakes, owing to the loosening of the chain, *l* (Fig. 1); by the forward movement of the pin, G. To put on the brakes it is simply necessary for the engineer to put the brake on the locomotive, when the draw bar will be forced in, causing the wedges, K, to enter the slots, *n*, by which the plate is raised and the spring released and the brakes set.

In backing, the reverse bar, A B (Fig. 3), is forced in and carries with it the bifurcated lever, E F, which in turn draws the chain, K L, forward and with it the lever, O (Fig. 1), which forces forward, the follower, *q*, thus loosening the brakes. For use around yards there is provided a device which, by winding up the regular hand brake, first lifts the plate, D, and then draws forward the lever, O, thus throwing the brake off.

Among other advantages the inventor claims that the brake is extremely simple and cheap to construct; that there will be no flat wheels and consequently no returning; that there will be no strain upon the locomotive, as a slight pressure sets the brakes on the first car and they in turn set all the rest; foreign cars do not interfere with its operation; that it will take up its own slack as the shoes wear away; that it steadies the motion of the train; that it will stop runaway cars, as they cannot go far without touching and setting the brakes; that as all brakes are set instantaneously, the train can be stopped as quickly as the locomotive; that when at rest all brakes are set and no effect will be produced by the wind; the engineer can regulate the speed of stopping by drawing ahead as soon as the brakes are set, thereby releasing as many of the forward brakes as he may desire.

Reserve Power a Necessity.

It is not wise to work constantly up to the highest rate of which we are capable. If the engineer of the railroad were to keep the speed of his train up to the highest rate he could attain with his engine, it would soon be used up. If a horse is driven at the top of his speed for any length of time, he is ruined. It is well to try the power, occasionally, of a horse or engine, by putting on all the motion they will bear, but not continuously. All machinists construct their machines so that there will be a reserve force. If the power required is four horse, then they make a six horse power. In this case it works easily and lasts long. A man who has strength enough to do twelve honest hours of labor in twenty-four, and no more, should do but nine or ten hours' work.

The reserve power keeps the body in repair. It rounds out the frame to full proportions. It keeps the mind cheerful, hopeful, happy. The person with no reserve force is always incapable of taking on any more responsibility than he already has. A little exertion puts him out of breath. He cannot increase his work for an hour without danger of explosion. Such are generally pale, dyspeptic, bloodless, nervous, irritable, despondent, gloomy. We all pity them. The great source of power in the individual is the blood. It runs the machinery of life, and upon it depends our health and strength.

A mill on a stream where water is scanty can be worked but a portion of the time. So a man with little good blood can do but little work. The reserve power must be stored up in this fluid. When the reserve power of an individual runs low, it is an indication that a change is necessary, and that it is best to stop expending and go to accumulating, just as the miller does when water gets low in the pond. Such a course would save many a person from physical bankruptcy.—*Herald of Health.*

Liquid for Determining the Specific Gravity of Minerals.

Nearly all natural minerals are heavier than water, and therefore sink in it. But when they are placed in a heavy liquid which does not dissolve them, some sink and others float. If two minerals of unlike gravity occur in the same rock, they can be separated by pulverizing the rock and putting them in a liquid intermediate in weight between both.

A new liquid for this purpose has been devised by C. Rohrback, having a density of 3·57. It is an iodide of barium and mercury, and is prepared as follows: 100 parts of iodide of barium and about 130 parts of red iodide of mercury are mixed with about 20 c. c. of distilled water, shaken, and heated on an oil bath to 150° or 200° C. until dissolved, and then concentrated until it will float a crystal of topaz. After standing several days the clear liquid is decanted and filtered. It has a yellow color, boils at 145° C., and refracts light strongly. It can be used for separating axinite, kyanite, in part, epidote, heavy mica, some garnets, and nearly all hornblendes; also jade, olivine, orthite, nearly all members of the pyroxene group, saussurite, titanite, topaz, heavy tourmaline, vesuvianite, and basaltic rocks. In diluting it to obtain any special density, it is mixed with a dilute solution of the same, so as to avoid precipitation. After the separation the powdered minerals are washed with a few drops of iodide of potassium.—*Wiedermann's Annalen.*

SAN FRANCISCO is trying to prevent the landing of lepers from the Sandwich Islands.