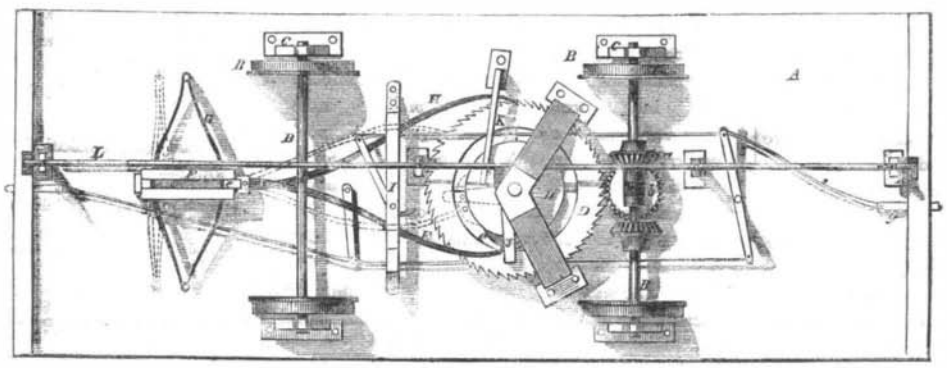
BRAKE FOR STREET RAIL CARS.

That increased facilities for commerce and transportation cause greater influx of traffic and travel to the principal streets of large cities is indisputably recognized, and where the consequent inconvenience of narrow thoroughfares cannot be corrected, it must be modified, by economizing time and space. Since the introduction of street railroads in some of our principal cities, in place of the antiquated stage-coach, the public have experienced great convenience in the facility of transit—the sidewalks are relieved from pedestrians and the center of the street from vehicles. Space is thus economized, because omnibuses are in a great degree abolished; while the work heretofore inadequately performed by three of those vehicles is easily accomplished by one car in half the time, notwithstanding it is concentrated and confined to one channel. The cars being quickly stopped by the application of the brake, the most refractory horses are immediately arrested.

We here present to the notice of our readers an illustration of an improved system of brakes, the object of which is to lessen, to a great extent, the labor of stopping and starting the cars on street railroads, which consists in employing the momentum of a car to wind up a spring and apply the brakes at the pleasure of the driver, and to apply the counteracting influence of the spring when wound up to the brakes in such a manner that they give the car a forward impulse when relieved, and thus overcome the extra power at present required of the horses in starting from a "dead stand." For street railroad cars these advantages will be more readily felt, as the cars are continually stopping and starting to receive and discharge passengers, and where passing vehicles are on the track.



JENKS & STEERS' BRAKE FOR STREET RAIL CARS.

The annexed cut represents the bottom of a street railroad car, with the system of brakes applied thereto, which, with a short description, will be made plain to such of our readers as are skilled in this class of inventions.

A represents the flooring of the car body, B, the wheels, C, pedestals in which are hung the axles, B', all of which parts are in common with those of the present construction for city cars.

On the forward axle are keyed two bevel gear-wheels, *a a'*, either one of which is kept in gear with a bevel gear wheel, *b*, which engages with a spur wheel (not shown in the engraving) that gives motion to a small pinion which, in its turn, actuates the large horizontal ratchet wheel, D, with a rapid motion. On the bottom of the ratchet wheel, D, is fixed a hub, D', having an annular groove in its circumference, in which groove plays the brake block, *c*, and this block is jointed to a curved arm, E, that proceeds to the rear of the car and connects by a joint to a sliding block, *e*, which plays longitudinally back and forth in a grooved box, F, and which is acted upon by an elliptic spring, G, so as to be forced forward. H is a curved pawl bar that is also jointed to the sliding block, *e*, and which is acted upon by the ratchet wheel, D, simultaneously with the movement of the arm, F. Both the bar, H, and arm, E, pass through, and are guided by the slotted hanging bracket, I.

J is a clutch arm that is capable of moving up or down on the ratchet wheel (D) shaft, but which will allow this shaft to turn in it freely until it is clutched with the ratchet wheel, D, where it then fixes the block, *c*, to the ratchet wheel and causes the block to turn with this wheel and compress the spring, G, which operation brings the wheels gradually to a stand still, and the pawl bar, H, keeps the spring, G, in this compressed state until it is relieved from the ratchet wheel, D, in starting the horses by an arrangement of levers that are connected to the draught pole, *g*, which levers merely disengage the pawl from the wheel, D, when the spring, G will throw the break block, *c*, around to its normal position.

After the brake block is applied to the hub, D', it is carried one quarter round and stopped by a wedge bar, K, which disengages the block and clutch arm, J, from the ratchet wheel; the ratchet is then capable of rotating, but still it is under the influence of the brake block, *c*.

The application of the brake block to the hub, D', is effected by a rod, L, that extends from end to end of the car, and a hand lever projecting up from the platform in a convenient position to the driver, with a vibrating yoke plate that actuates the hub of the clutch arm, J; the driver has only to move the hand lever to one side or to the other to apply the brakes.

The operation of stopping or starting the car is as follows:—The driver, when he wishes to apply the brakes, moves the lever that is attached to rod, L, which engages the brake block with the ratchet wheel, D, and causes this block to press upon the periphery of hub, D', in consequence of the action of the spring, G, the car is thus gradually stopped. In starting the horses again, they relieve the brake block suddenly, as before described, and cause the spring to act indirectly upon the car wheels, so as to propel the car forward when the movement is kept up by the horses.

This comparatively simple improvement is another beautiful illustration of the employment of mechanical instead of animal power, the patent for which was procured through the Scientific American Patent Agency, and any further information in relation to it may be obtained by addressing the inventors, R. W. Jenks, Jr., and F. A. Steers, at Providence, R. I.

SUGAR.

Until a comparatively modern epoch, sugar was neither considered a luxury nor a necessary of life. It is a question whether it was known to the ancients; but Salmarius in his exercitations upon Pliny, and Matthiolus on Dioscorides, lead us to believe that it was so, and indeed, the former assures us that the Arabs have used the art of making sugar, as we now have it, for nearly a thousand years. In the Bible, allusions are made to "the sweet cane which came from a far country;" but the cane was not cultivated, and the saccharine matter was allowed to ooze out of the cane itself, and to harden like gum. It was known as "Indian salt," and only used as medicine, for which purpose, about 800 years ago, it began to take the place of honey.

Our word sugar is derived from the Arabic *soukar*, but its Latin name is *saccharum*, now applied to all sweet-tasting fluids. The sugar-cane grows in any hot climate, and is supposed to have heen brought into Europe first from the interior of Asia to Cyprus, thence to Sicily, Madeira and the Canaries. The Portuguese and Spanish navigators introduced it into the West Indies and tropical America, whence we now obtain our supplies of sugar.

There are other varieties of sugar produced by different plants. Thus, in North America a large proportion is extracted from the maple tree, and in France from the beet-root. Sugar in plants is analogous to fat in animals; as if it were the end a plant had in view by its vitality to produce and lay up in store within itself—sugar; hence, the subservience of plants to man in this case is self-evident. Nearly every flower-cup contains a minute portion of sugar, which, being gathered by bees, we are familiar with as honey, the peculiar flavor of which depends upon the blossoms it is taken from. Grapes are so full of sugar that, when dried, white crystals of it are found within the fruit, and which may be seen when resins are cut open.

Manna is a kind of sugar which exudes from certain plants (*algul*) as we see gum does from plum-trees in our gardens; but the analogy is not correct unless we understand that manna covers the whole plant leaves and branches. The Arabians have a tradition that the manna mentioned by Moses fell from the clouds upon the plant algul. It is now pretty well understood that the natural constituents of plants do change from one substance to another; as the worm becomes the chrysalis and then the moth, so will starch become sugar, and sugar turn acid at the plant's behest.

Sugar is a most excellent and useful food, and the "sweet tooth" of youth instinctively induces us to eat it at a time of life most befitting the animal economy. One quality, however, of sugar renders it most remarkable—the most important of all vegetable products to man—and that is its convertibility into alcohol or spirit. When sugar is dissolved in water in contact with certain fermenting substances, or when the sweet expressed juice of fruit is allowed to remain exposed for a few days an intestine revolution takes place spontaneously—the saccharine or sugar disappears, and in its place is found that all-potent liquid alcohol. Chemically speaking, the phenomenon of this change was the most difficult, the most inscrutable of explanation; hence the enormous research of the philosophers for a solution of the problem.

Where the laborers are many, the harvest should be fruitful; and so it has been in this instance. The researches into this elixir of life, or *aqua vitæ*, as it is termed, have been the foundation of the most sublime of sciences—chemical philosophy. As we have stated, starch is convertible into sugar, and this often takes place without our cognizance. Potatoes consist of nearly all starch; when "frosted" they become sweet, the starch turns to sugar. Nearly all seeds contain starch; and when they begin to germinate, the starch becomes sugar, fit food for the young plant till it has acquired leaves; thus barley is made to grow. In the hands of the maltster the starch in the barley becomes sugar; the conversion of this malt into liquor, whisky, &c., is then the new garb of sugar.

The following are the approximate quantities of sugars produced annually in different parts of the world:—Cane sugar, 25,000,000 cwts.; beet root sugar, 3,250,000 cwts.; palm sugar, 2,000,000 cwts.; maple sugar, 405,000 cwts.; manna and honey, 10,500 cwts.

SEPTIMUS PIESSE.

WHALE LEATHER.—Squeezing oil out of stone coal was a thing to be thought of as a miracle that might some day convert the heathen; but to get shoe leather from the skin of a whale is so reasonable a probability, that one is amazed it should not have been long ago attempted. A Frenchman has obtained a patent for whale leather, and remarkably pliant stuff it is. The skin is so thick that, after removing the inner portion, which is spongy, the remainder is split to make it of the usual shoe thickness. It is remarkably tough, but as soft as buckskin, and it repels water well. The Yankee boot is most miserable; the leather is spoiled by bad tanning and worse working-up. This makes an unfair relation between supply and consumption, which it will need all the whales of ocean to equalize. The discovery comes at a time when land leather is growing alarmingly scarce; and we behold in it a beautiful provision of Providence, only excelled by the discovery of coal oil at a juncture still more critical in the history of human progress.

TROWS' CITY DIRECTORY FOR 1860.—The seventy-fourth annual "New York City Directory," has just been published by Mr. John F. Trow; H. Wilson compiler, No. 50 Green-street. It contains over 1,000 pages, and 150,303 names—an increase of 2,978 more than the volume of last year. It is the most useful book for business men published in the city, and the present volume is in many features the best that has ever been issued.