Infringement of Patents.—Street Cars.

The case of Stephenson *vs.* the Brooklyn Crosstown Railroad Company, decided by the Supreme Court of the United States on the 23d of March, was a suit for the alleged infringement of three patents, upon improvements in what are commonly called "bobtailed" or one-horse street cars. The improvements set forth in the specifications of the patents were, first, the lever and bar enabling the driver to open the rear door of the car; second, the bell cords running along the sides of the car over the windows; and, third, the mirror over the driver's head to enable him to see the interior of the car without turning around. The court holds that these improvements, so far as they embodied any patentable device, had all been anticipated by other persons before the patents here in controversy were issued, and that such patents were consequently void.

A New Use for Asbestos.

In the processes connected with dyeing and printing of cotton cloth it is frequently necessary to hang the fabric in loops from parallel rods for the purposes of exposure to steam, air, or ammonia. In order that the cloth should hold upon the rods without slipping or being strained, it is necessary to wind rope or strips of cloth around the rods, but this only mitigates the difficulty without accomplishing its removal, for the heat and corrosive action of the vapors rot any covering in a few weeks, and the first notice of any deterioration is generally the appearance of small pieces of roll covering among the cloth in process of finishing. Recently asbestos rope and asbestos cloth has been used for this purpose, and proves to be very durable. Larger ropes of this refractory material have been used for the transmission of power over places exposed to heat.

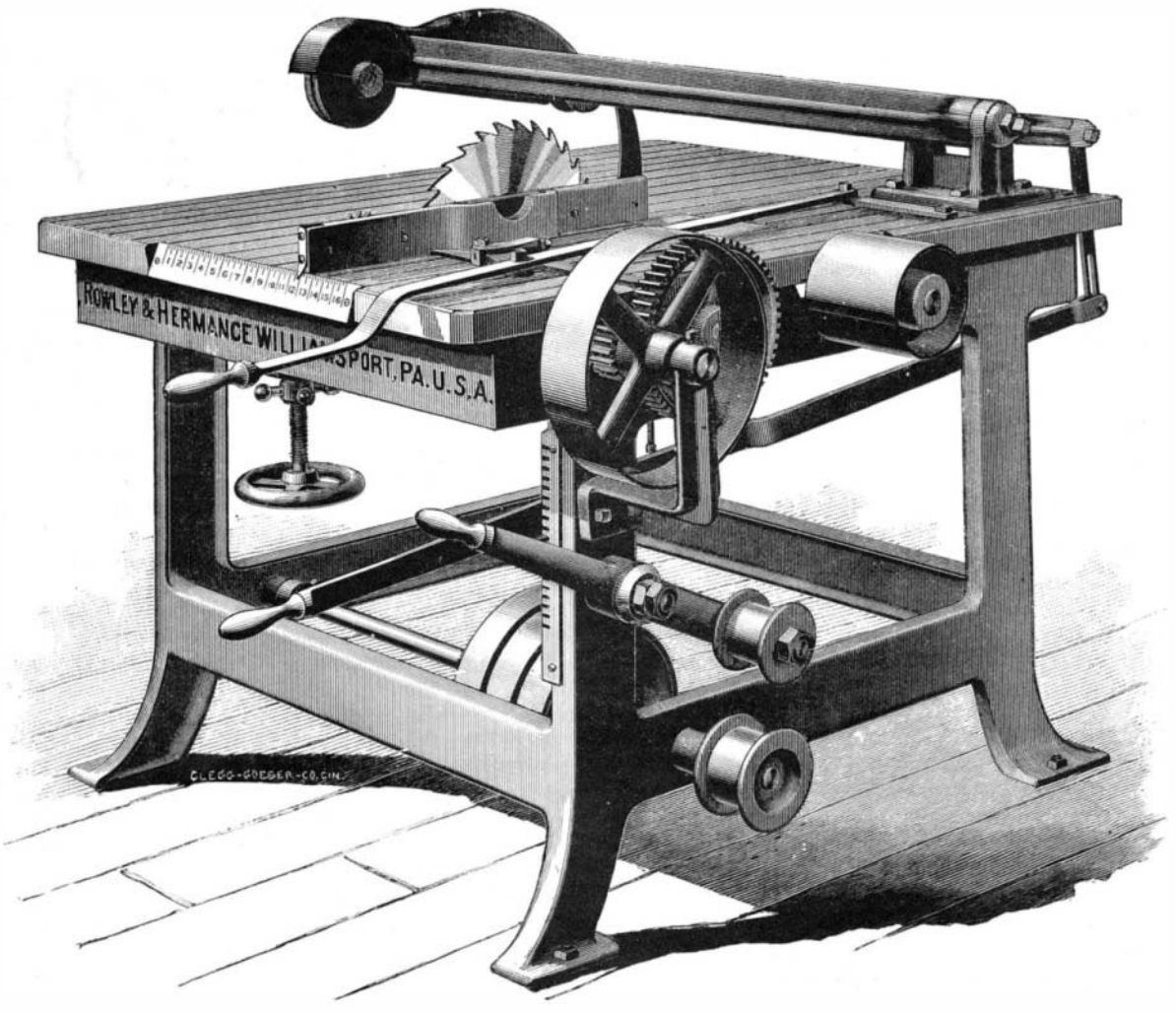
SELF-FEEDING RIP SAW TABLE.

The self-feeding rip saw table shown in the accompanying illustration is intended to take the place of the ordinary hand feed rip saw, and is designed for ripping lumber into strips of any width up to 16 inches wide and 6 inches thick. The frame is very heavy and strong, and is made entirely of iron cast in one piece; the table is of hard, well seasoned wood, glued up of narrow strips. The table is hinged at the back end, and can be raised or lowered by means of a hand wheel screw at the front end, as shown in the engraving. This admits of the table being raised above the feed saw, and by throwing the pressure arm out of position the machine can be used as an ordinary hand rip saw table.

There are three rates of feed, slow, medium, and fast, being at the rate of 45, 100, and 160 feet per minute, respectively. The feed works, being very powerful, are capable of ripping 3 inch plank at the same speed as 1 inch boards; the feed roll marks are taken out by the saw, leaving no mark on the lumber. Starting and stopping are accomplished by means of a tightener.

A new and valuable feature is the setting device. The gauge can be set at any mark of the index plate, or at any fraction of an inch, and by a slight movement of a lever can be held rigidly in position. The arm, with pressure roll, presses the lumber down on the feeding saw sufficiently to insure a strong and reliable feed. The pressure arm can be instantly adjusted to different heights by the lever running under the machine, the handle being within convenient reach of the operator. When in operation the saw is covered by a shield and the table is provided with a spreader, making it impossible for a board or short pieces to be caught and thrown over the saw thus avoiding accidents arising from this cause. The saw is run at a speed of from 2,800 to 3,000 revolutions per minute.

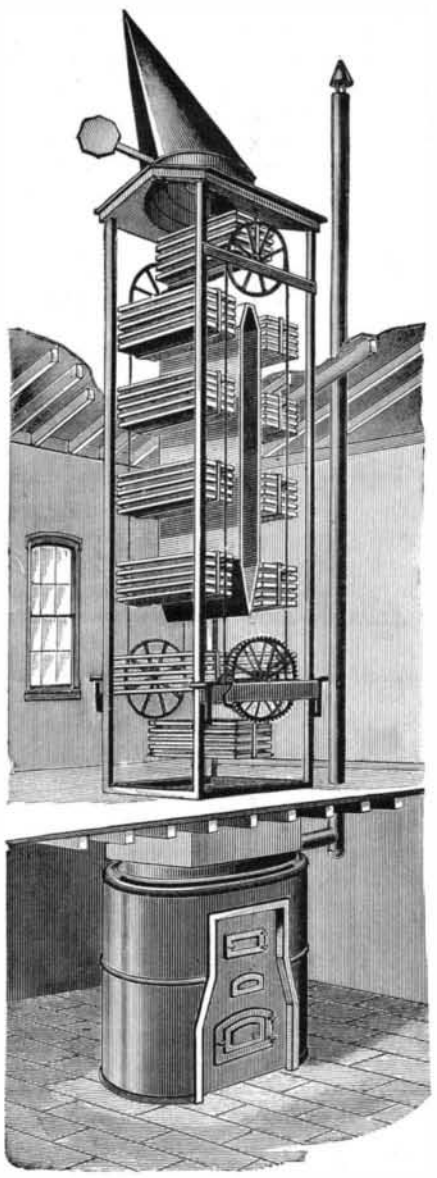
The machine is well-proportioned and strong in all its parts, and the makers, Messrs. Rowley & Hermance, of Williamsport, Pa., state that by replacing hand rip saws with it the capacity may be doubled with less hard work, and the liability of accidents be lessened.



ROWLEY & HERMANCE'S SELF-FEEDING RIP SAW TABLE.

EVAPORATOR FOR DRYING FRUIT, ETC.

The Williams evaporator, herewith illustrated, is designed for the drying of fruit, vegetables, etc., and while being simple in construction, easy to handle, and continuous in operation, there is no danger of overdrying or burning the fruit.



WILLIAMS' EVAPORATOR FOR DRYING FRUITS, ETC.

The evaporator consists of a vertical trunk about 32 feet high, 5 feet 1 inch wide, and 5 feet 8 inches deep, divided by a partial partition into two evaporating flues, through which the fruit to be dried is slowly passed. At the top and bottom of the trunk are shafts, each of which carries two wheels; the upper and lower wheels are connected with endless chains formed with projecting pins, from which light frames are suspended.

Between the frames filled with trays are spaces of about 15 inches, forming a number of air chambers at certain intervals in the flues. On two sides of the trunk are doors conveniently located for putting in and taking out the trays. The heaters require no masonry, and either wood or coal may be used as fuel. By means of a damper the heat may be thrown into either or both flues at will, and the operator is enabled to control the heat as occasion may require.

The trays containing the green fruit are inserted through a small door, about 4 feet above the furnace, and passed downwardly directly over it, thus heating the fruit rapidly to as great a degree as it will bear without materially changing its color. When first put in, the degree of heat may be very high without danger, since the fruit is cool and contains all its original moisture, and the hot air surrounding it is free from vapor, and will not penetrate and scald the fruit as moist air would. It then rises gradually through the hottest flue, the hot air being thrown under the trays by deflectors on the inside of the walls of the flue; the heated air and vapor pass off at the top. While rising, the greater degree of heat the outside of the fruit received while passing over the heater diffuses itself through the fruit; and while descending the other flue to the operator, the drier fruit, preceding the moist, enters the increasing heat, and arriving at the door is removed by the operator, who inserts another tray of green in its place, thus making the operation continuous. The fruit, having been dried in the least possible time, and having been uninjured by scorching or cooking, retains its original color and flavor. The construction of this apparatus enables the operator to evaporate, at the same time, different kinds of fruit which require more or less time and heat.

The principle governing the construction and operation of this evaporator is sound; by first exposing the green fruit to a high, dry heat and passing it slowly to a lower temperature, and then in its downward passage through the second flue subjecting it to a dry, heated current moving upward, the fruit is not so apt to be injured as in the case of its exposure in a moist atmosphere from which it passes into an intense heat.

The capacity of the evaporator described above is 150 bushels of apples or 200 baskets of peeled peaches in 24 hours. Letters of recommendation received by the manufacturer, Mr. S. E. Sprout, of Muncy, Pa., who should be addressed for further particulars, while highly indorsing the evaporator, state that it will appreciably exceed the guaranteed capacity if properly run.

Improvement in Chimneys.

The *Building Times* (London) says the best chimneys are made by inclosing hard baked glazed pipes in a thin wall of bricks. Such chimneys will not only draw better than those made in the usual way, but there will be less danger from "defective flues." A four inch wall of brick between us and destruction by fire is a frail barrier, especially if the work is carelessly done, or the mortar has crumbled from the joints. To build the chimneys with double, or eight inch, walls makes them very large, more expensive, and still not as good as when they contain the smooth round flues. To leave an air chamber between them for ventilating is better than to open directly into the smoke flue, because it will not impair the draught for the fire, and there will be no danger of a sooty odor in the room when the circulation happens to be downward, as it will be occasionally. The outside chimney, if there is one, should have an extra air chamber between the very outer walls and the back of the fireplace to save heat, a precaution that removes, to a great extent, the common objection to such chimneys. A very large per cent of fires comes from defective chimneys.

Rules of a Carriage Factory.

The following rules govern the factory of James H. Birch, of Burlington, N. J. The *Carriage Monthly*, from which we copy, thinks "they have a mighty business sort of ring":

1. If you do not mean business, you are not wanted.
2. Running to beer shops in working hours will positively not be allowed.
3. Any one bringing spirituous or malt liquors on the premises will be discharged.
4. Wages will not be paid until six o'clock P.M., and only at the office.
5. Six days make a week, and ten hours make a day. Men working by the piece that loaf three days in a week, and then want to make a big week's work in the next three days, I will not employ.
6. All work must be done in a mechanical manner, or it will not be paid for.
7. Men working by the piece, their parts must be finished before they are counted and paid for. Any man caught giving a false account of his work will be discharged.
8. No work will be allowed taken in by employes. Material to be used only for work belonging to the shop.
9. Strictly business in working hours, as no place can be run successfully on any other principle.

The above rules will be enforced without fear or favor. Any employe not wishing to comply with them can withdraw without any controversy.

The Profits of Gas Making.

A Senate committee that has been investigating our New York city gas companies has struck on a veritable bonanza, and the pay chute continues without sign of exhaustion. It is very refreshing in these hard times to read of regular dividends of 25 per cent, with an occasional "extra" and a large reserve fund; but our admiration is greatly increased when we find these magnificent dividends are declared on stock that is largely "water" and in some cases was all "bonus," and never represented any "cash," the working capital being something, we might almost say, in general furnished by the sale of bonds.

The following are a few of the records as published in the daily papers:

The Manhattan Gas Company was chartered in 1830, with a capital of $500,000, $320,000 of which was paid in, and the balance was returned in installments, presumably out of profits. In 1847, the capital was increased to $1,000,000; in 1852, to $2,000,000; in 1855, to $4,000,000. The price charged for gas has pretty steadily declined from $7 per thousand feet in 1836 to $1.75 per thousand, the present price.

In 1874, the Manhattan Company made 377,500,000 cubic feet of gas, being at the rate of 10,352 feet per ton of coal used. The loss from leakage was 14·4 per cent; candle power, 17·32. The cost of production, $1.23 per thousand feet. Selling price, $2.50. By-products brought $143,257. The company declared, in 1875, 35 per cent. For several years past, the company has produced over 1,300,000,000 feet annually. The return per ton of coal has improved to 10,844 feet; the loss from leakage still averages over 14 per cent; the candle power has improved to about 19½; and the cost of manufacture at the meter has declined to about 66 cents and in the holder to about 50 cents per thousand feet. The selling price for four years past has been $2.25 per thousand feet. The dividends, 25 per cent, with an extra 10 per cent when the company consolidated at the close of last year. The dividends for the past ten years have averaged over 21 per cent.

The New York Gas Light Company was organized in 1823, with $1,000,000 capital. In 1871, this was increased to $4,000,000 by issuing four shares of new stock for one of old. "No cash was paid in." In the consolidation a few months ago, this company was put in at $7,560,000. The works have now a daily capacity of 6,000,000 feet. The dividends paid were 20 per cent in 1875; 10 per cent in 1876 and 1877; 8 per cent in 1878; 4 per cent in 1879; 8 per cent in 1880 and 1881; 10 per cent in 1882 and 1883; 15 per cent in 1884; average for ten years, 10·3 per cent. In 1878, this company paid the Municipal Company $300,000 for the right to make water gas under the Tessie du Motay patents, and has since used water gas enriched by naphtha. In 1879, there was a war with the Mutual Company (which also made a water gas).

The Municipal Company has been paying dividends at the rate of from 15 to 20 per cent on its capital of $3,000,000.

A few points of considerable interest have been brought out. The enormous increase of gas consumption and the more intelligent administration have reduced the cost of production in the past ten years from $1.23 to about 45 cents per thousand feet, or a reduction of over 60 per cent. The cost to consumers in the same time was reduced 10 per cent. The dividends and the value of the property were increased.

WATER GAS.

The companies that ten years ago denounced water gas as highly dangerous to the public, and supported their absurd assertions by the reports of some of our well known "professors," in order that they might defeat the introduction and competition of cheap water gas, having in a great measure succeeded in this object, quietly themselves commenced the manufacture and distribution of the "deadly water gas" that they had so long denounced. There are few people, says the *Engineering and Mining Journal*, probably who know the progress made in the introduction of water gas in the past ten years. Most of the Pennsylvania cities, Baltimore, New York, and several of our other large Eastern cities are now lighted to a great extent with an enriched water gas; but the present enormous consumption will sink into insignificance when the cheap unenriched water gas is distributed for fuel. The success of the new incandescent fuel gas light, to which we have already made references in these columns, promises to bring about this change soon. We may then expect to see our gas, costing consumers say 50 cents per thousand feet, used generally for fuel, and at the same time furnishing a much better light than we now have. Of all investments now before the public, gas making appears to be the most profitable and the least liable to loss.

Progress in Marine Steam Engineering.

As regards progress in marine engineering, there is no doubt, says *Engineering*, but that the leading fact of the past year is the decided step forward which has been made by the triple expansion engine. It is but right that we should take notice of the progress that is now showing itself. The triple expansion system was adopted last year in the Australasian by Messrs. Robert Napier & Sons, whose engineer partner, Mr. A. C. Kirk, was the first person on the Clyde to give practical shape to the principle of triple expansion in marine engines. In his hands a steam pressure of 125 pounds per square inch was adopted in the Aberdeen, of which the Australasian may be said to be a sister ship. The same system was also adopted by the same firm in the Mexican steamers which they built and fitted out. Messrs. Rankin & Blackmore, in the early part of last year, resolved on adopting a steam pressure of 150 pounds per square inch in the patent triple expansion twin screw engines which they constructed for the steamer Arabian—four cylinders being employed for the purpose.

In the case of the Shaw-Savill and Albion companies' two splendid steamers built last year by Messrs. William Denny & Brothers, and engined by Messrs. Denny & Co., a steam pressure of 160 pounds per square inch was adopted. Such a forward step showed that Mr. Walter Brock, of the last named firm, had great faith in the system of triple expansion; and the results attained by the Arawa, the first of those two steamers, abundantly show that his faith was well founded. That vessel has at sea done 13 knots an hour on a consumption of 50 tons of coal per 24 hours, from which fact it is quite evident that large ocean steamers need not, to such an extent as hitherto, be floating coal pits rather than profitable cargo carriers. Incidentally, we may mention that the consumption of fuel in the steamer Arabian, already alluded to, has been brought down to the very low rate of about 1½ pounds per indicated horse power per hour. So far as we remember, no lower rate of consumption has been got with any of the splendid engines turned out by Messrs. Elder & Co.; certainly there was no advance made in that direction last year over the results attained in the preceding year. In the early future, however, we may expect to hear of further progress, inasmuch as Messrs. Elder & Co. are now engaged in the construction of triple expansion engines for the steamers Parthia and Batavia, lately belonging to the Cunard Company. In the case of these new engines, we understand that a steam pressure of 150 pounds per square inch is to be adopted whereas the highest steam pressure yet resorted to in any engines constructed at Fairfield has not exceeded 110 pounds per square inch.

There are at present in hand, or projected, something like twenty steamers in which there is every probability that triple expansion engines will be adopted, with working steam pressures ranging from 135 pounds to 160 pounds per square inch. We have mentioned the Parthia and Batavia, the engines of which are well nigh completed. Messrs. Caird & Co. have in hand a new steamer for the P. & O. Company in which triple expansion engines are to be fitted. Messrs. Alexander Stephen & Sons are engaged on four steamers regarding which the same may be said, a working pressure of 160 pounds having been adopted in this case. That is also true of five steamers which Messrs. Denny & Brothers have in hand, chiefly if not wholly for the British India and New Zealand lines. Messrs. D. & W. Henderson & Co. have in hand three steamers in which triple expansion engines are to be adopted, one of them being a magnificent yacht for Mr. Clark, of Paisley, and in which a working steam pressure of 135 pounds is to be employed. Messrs. A. & J. Inglis have in course of construction a steamer for the Clyde and Dublin passenger and cargo trade, whose engines are to be of the kind under notice. Of the cases in which such engines are spoken of as being probable, we need not speak any further. Quadruple expansion is also regarded as one of the possibilities, and even as one of the probabilities, of the early future of marine engineering.

It does not appear that in ordinary compound engines, even of the three cylinder type, higher working pressures than 110 pounds have yet been adopted on the Clyde. That is the pressure reached by Messrs. Elder & Co. in the Umbria and Etruria, and it is the pressure employed by Messrs. J. & J. Thomson in the two Channel paddle steamers already spoken of; and doubtless other instances of the same pressure could be adopted. We have heard it stated, however, that the engines for the Admiralty steamer Scout, which Messrs. James & George Thomson have in hand, are to be worked with steam of 120 pounds pressure; but that is a matter that may be referred to on another occasion.

Intimately connected with the question of steam pressure is that of the material of which the boilers are constructed. No material change has taken place in recent years in respect of the form of boiler which is in such common use, but the constructive material employed has undergone a most complete change. So far as Clyde practice is concerned, it may be said that a marine boiler now being made of iron is quite a novelty, steel being employed almost universally. For boilers of the largest sizes, and involving such high steam pressures as we have been speaking of, very thick plates, even up to 1¼ inches and 1⅜ inches, are now in request, and the steel makers are turning out plates of such large areas that they not unfrequently weigh up to, or upward of, two tons. The material is produced of very high quality and at a very low price in Scotland, and almost at the very doors of the users, and hence the employment of it among Clyde marine engineers has progressed with most astonishing rapidity. The experience gained with it is of such a character that the utmost confidence is entertained on almost all hands regarding it. In cases where it has been used over periods ranging from five to seven years in fire boxes and combustion chambers, the ordinary wear and tear and lamination, so well known where iron is used for the same purposes, are not, as a rule, to be seen. For a time at first, engineers would not universally trust to the use of steel rivets in boiler making, but the opposite is now the rule, as the use of iron rivets in steel boilers is about as great a rarity as a new iron boiler. Of course, the question of hand riveting *versus* machine riveting now comes in for consideration, and we are glad to know that riveting machines are getting more and more extensively into use.

London Automatic Post Offices.

A London paper describes a novel plan for supplying stationery to railway passengers. In nearly every railway station is a small box on legs, painted crimson, which may be called an automatic post office. It is divided in two compartments. On the top are apertures admitting a penny, one being for postal cards and the other for envelopes. You drop a penny through the slot and open a little drawer beneath, and presto! you find a postal card. Drop two pennies in the right hand slot, open a corresponding drawer, and you find a stamped envelope containing a dainty sheet of note paper. These little conveniences are the property of a company (limited, of course). The profit must be very small, and only on the envelope and sheet of note paper. It may consist in its conveniently getting out of order occasionally and refusing to deliver; your penny has gone in and cannot be got out, and there is no satisfaction to be had by objurgating the box. You can't get the best of it by dropping in a bad penny, as if not full weight it refuses to deliver, and keeps your short coin, confiscating that as a punishment for your attempt to cheat. It has a golden rule that works only one way.

Surgery of Dynamite.

The medical faculty have recently given some little attention to what they are pleased to call "Surgery of Dynamite," by which is meant the effect of dynamite explosions upon those in their immediate vicinity. It is interesting to learn from these discussions that the jar or shock which the system receives differs altogether from that which is the result of a blow upon the head or body, or resulting from railway collisions. These latter follow a comparatively well-localized and gross form of violence, whereas the shock coming from a dynamite explosion is diffused and divided.

In the case of the two young women who were injured by the recent explosion in the Tower of London, neither suffered from contusions, nor did they bear any marks of wounds save a few scratches received from falling upon a pile of rubbish. The sensation they experienced was not that of being violently knocked down, but of being "pushed back." Both suffered from severe pain along the right inferior dental and auriculo-temporal nerves, and a profuse catarrh showed the meatus had been injured. Cole, the policeman, suffered from no complication through a fracture of his ribs, but, as in the case of the young women, his chief ailment came from a general enfeebling of nerve function, which caused a depression in the heart's action and a temporary loss of sight and hearing.