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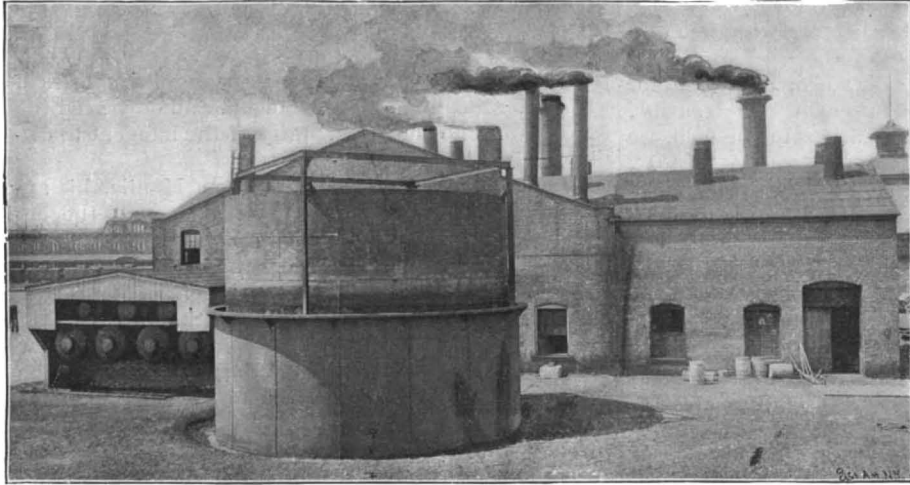
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A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS CHEMISTRY, AND MANUFACTURES.

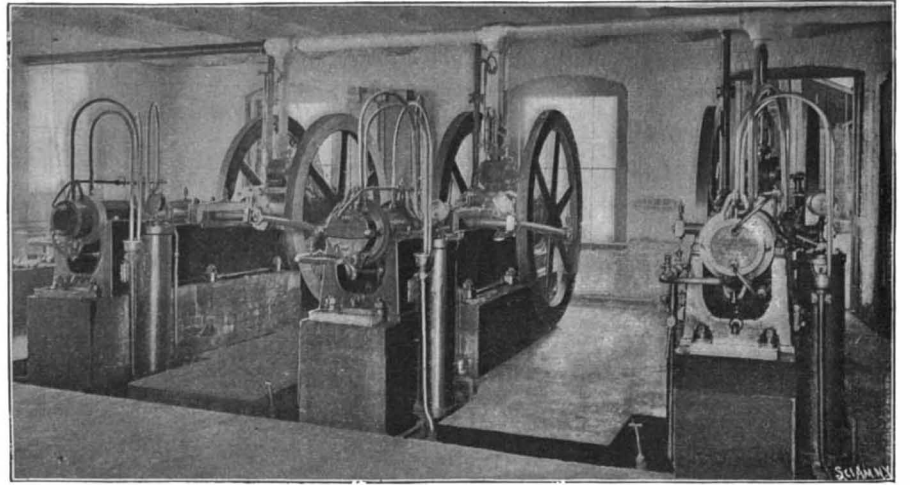
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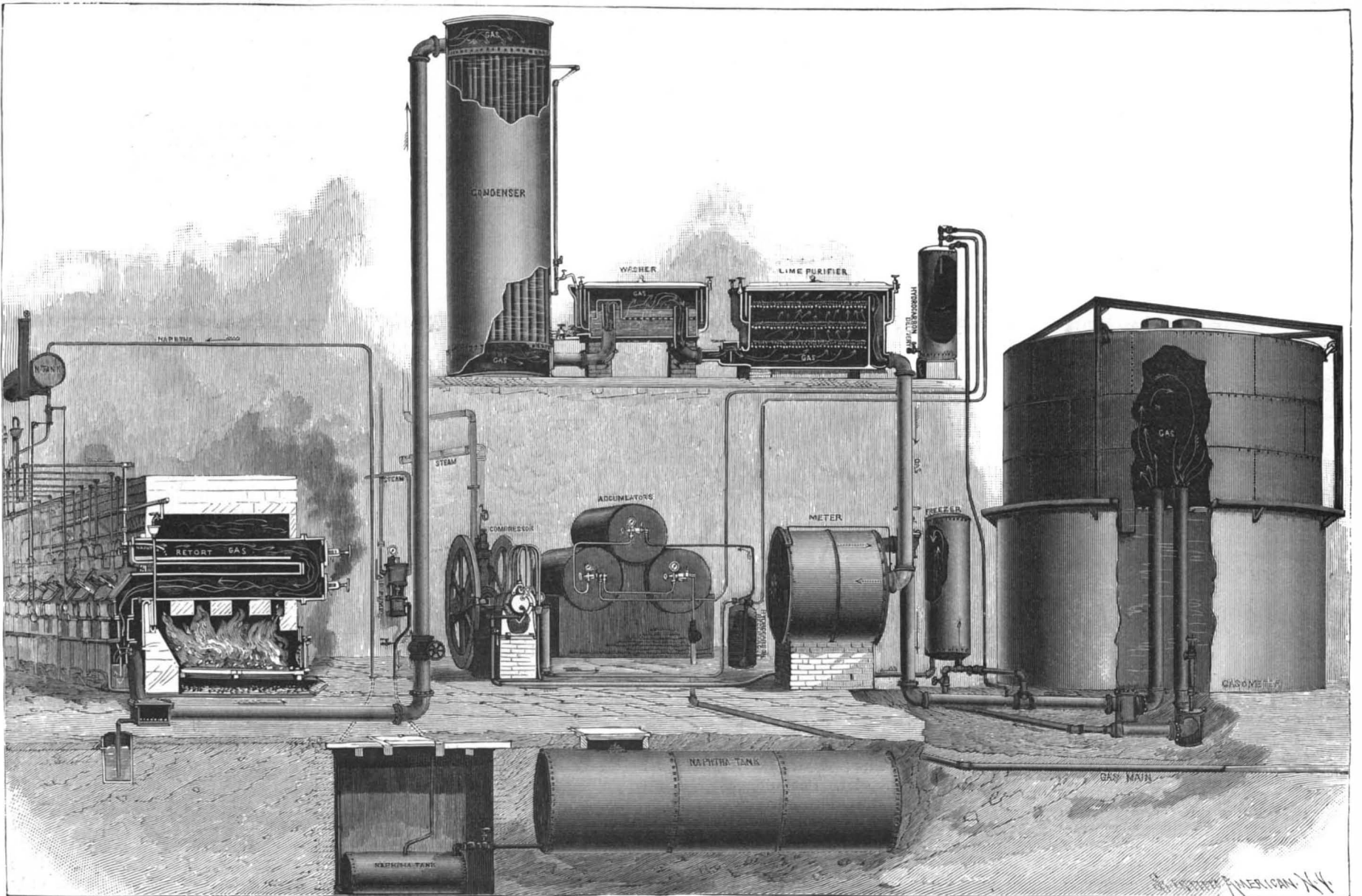
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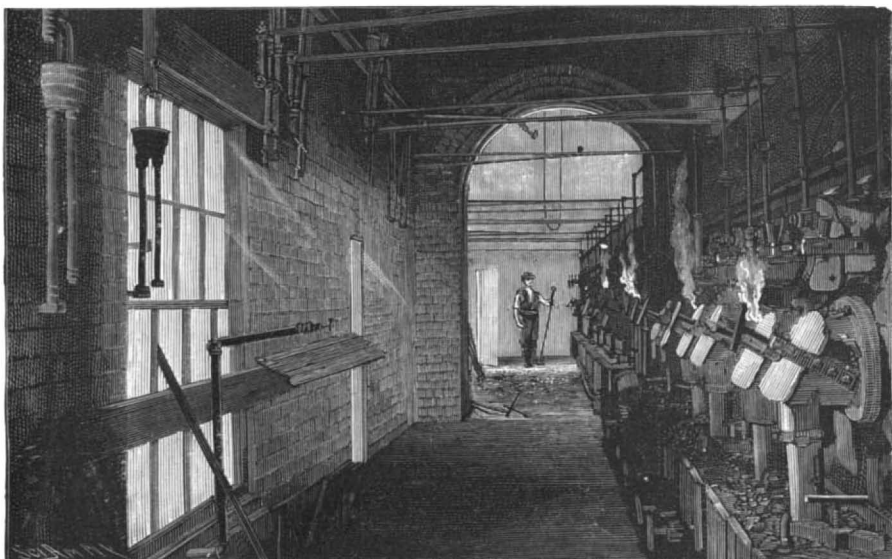
PINTSCH GAS WORKS AT NEW HAVEN, CONN.



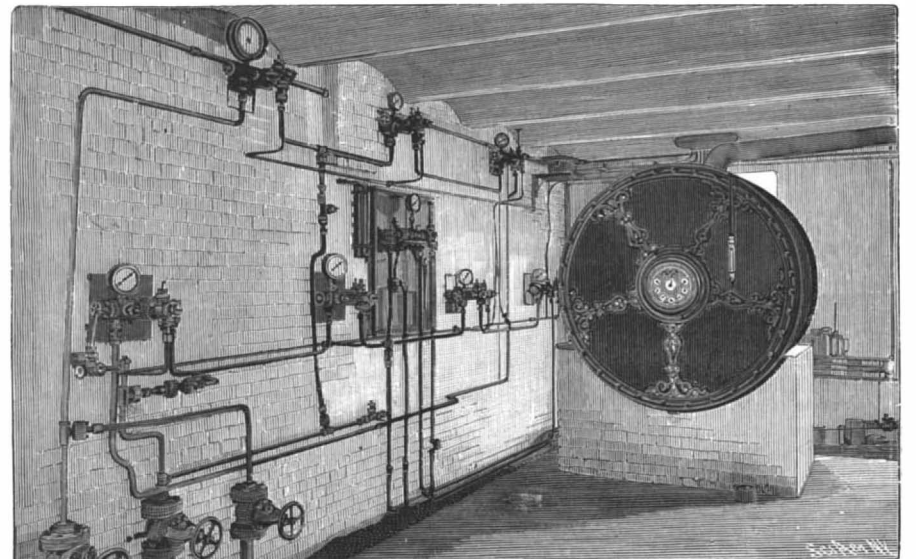
GAS COMPRESSORS.



ARRANGEMENT OF PINTSCH GAS PLANT.



REAR VIEW OF RETORTS, SHOWING OIL FEED-PIPES AND HYDRAULIC MAINS.



PRESSURE GAGES AND METER.

A TYPICAL PINTSCH GASLIGHT PLANT.—[See page 27.]

THE MANUFACTURE OF PINTSCH GAS.

History tells us that the first recorded instance of the lighting of railway cars occurred on a tram line, owned by the Stockton and Darlington Company, which ran between Darlington and Sheldon, England. The company boasted of a single coach, built by the great Stephenson in the year 1825, which was drawn by a single horse over iron rails between the places named. The "Experiment," as this forerunner of the Pullman vestibule was called, was a very modest and somewhat uncouth machine, which resembled—so says the historian—the caravans which were yet to be seen at county fairs containing the great "Giant and Dwarf" and other wonders of the world. A row of seats ran along each side, and a long table was fixed in the center, access being had by a door at the back end. It seems that to one Thomas Dixon, the driver of the "Experiment," belongs the credit of being the inventor of car lighting on the rail; for on dark winter nights, having compassion on the passengers, he would buy a penny candle and place it lighted among them on the rough board which answered the purpose of a table.

From the sputtering candle which made darkness visible on the "Experiment" to the brilliant Pintsch gas light of a luxurious modern railroad car is a far cry; and if space permitted, it would furnish an interesting story to follow the growth of car lighting through the intervening three-quarters of a century. Confining ourselves to the present subject, however, we must be content to state that Pintsch gas is so named after its inventor, Julius Pintsch, of Berlin, who, realizing the urgent necessity for a better method of lighting than by the oil lamp or the tallow candle, which was even in his day in use in some parts of Europe, invented his justly famous system of car lighting by gas. Briefly stated, Pintsch gas is a fixed gas manufactured from naphtha, which, after being thoroughly purified, is compressed into storage tanks, and from them drawn off through an automatic regulator, which reduces it to the pressure of one-third of an ounce per square inch, at which it is used at the burners.

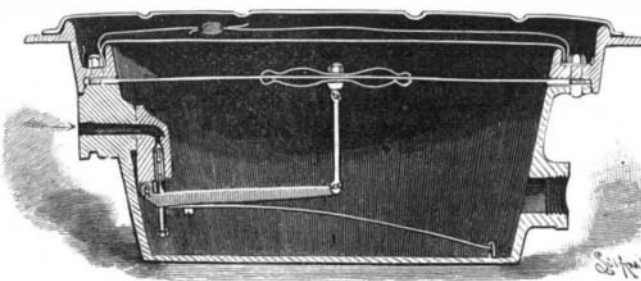
The gas was designed specially for the illumination of railroad cars; and while it has found a useful field in other directions, notably in the illumination of buoys and beacons, where its capacity for storage and its ability to stand rough usage without going out, render it extremely valuable, it is in car lighting that it has found, and is ever likely to find, its most successful application.

We present in this issue illustrations of a typical Pintsch gaslight plant as installed at New Haven, Conn., for supplying the cars of the New York, New Haven and Hartford Railroad. The plant consists of retorts for the distillation of the oil, purifiers, compressors, storage tanks and gas mains to lead the gas to the station platforms at which the storage tanks on the cars are charged. It should be explained that the general view of the plant varies in minor details from the plant as it actually exists, the relative position of the various parts having been rearranged somewhat, and the number of parts reduced, so as to place each step of the process clearly before the reader.

The oil from which the gas is made is known as "distillate," and is purer than the commercial naphtha. It is brought to the works on the company's cars in casks, and is run by gravity into three cylindrical storage tanks, whose combined capacity is 14,000 gallons. From these the oil runs through a pipe, which is provided with a check-valve, into a small cylindrical tank from which it is raised by pneumatic pressure to another tank of about 50 gallons capacity, located above the retorts. When the lower tank is full, the Westinghouse air pump is started, and the air, which is led in above the liquid, forces the latter out through the pipe which will be noticed leading from the bottom of the tank, and up to the tank above the retorts. The retorts are arranged in sets of four, two upper and two lower, with a fire below each set, and there are eight fires in all. The cast iron retorts are about 10 inches in diameter, with a 1½-inch shell. Each retort is connected with the one above it by a double bonnet at the

front end. The rear end of the upper retort is closed by a cover through which the oil is led by means of a small pipe. The lower retort leads into the "hydraulic main," by which the products of distillation are carried away for further treatment. The covers are taken off when it becomes necessary to clean the retorts and remove the deposits which gather on the inside of the shell. If the deposit is soft, it is cut away with a chisel bar, but if it is hard, it is burnt off by admitting a draught of air or by allowing a jet of steam to play upon it. The joints are sealed hermetically with lime to prevent the escape of the gas.

From the 50-gallon tank the oil is led by a small pipe into the upper retort, and spreads in a thin layer over a sheet iron tray, where it is vaporized by the heat



REGULATOR FOR CONTROLLING PRESSURE AT THE BURNERS.

of the furnace. The gas is prevented from returning by placing a suitable trap in the oil feed-pipe, and the flow of the oil is regulated by means of a micrometer screw which permits of varying the supply according to the temperature. The distillation of the oil which commences in the upper retort is completed in the lower one, where the heat is greatest. The gas passes from the retorts to a stand-pipe, which terminates in a sealing cistern of water at the bottom of the hydraulic main, the latter serving to prevent the escape of gas. The water is kept in constant circulation, being fed by a water pipe which runs above the retorts, and flowing out into the "tar trap" together with the gas and a small amount of tar which has been condensed in the cistern. The tar trap is a square iron box in which much of the tar, together with the overflow water from the cistern, is collected. From this the tar and water flow by gravity into a seal pot, which is shown in the illustration, sunk in the ground to the left of the tar trap. This is simply a cylindrical vessel filled with water, the pipe from the tar pot being carried down and opening into the vessel near the bottom. The arrangement seals the apparatus against

lower floor. From the condenser the gas passes into the washer. It enters through a vertical 6-inch pipe, the top of which is covered by a hood, which dips one inch below the surface of the water and below a horizontal perforated screen. The gas is thus caused to pass through the water in innumerable fine streams, with the result that it is freed from impurities, which consist chiefly of the heavy and ungasified portions of the oil, that are not removed by cooling and are carried thus far in the process. The gas is next led to the purifier, a rectangular iron box containing a number of perforated trays, on which is spread a layer of wood chips and shavings covered with slaked lime. The shavings are placed there to keep the lime loose and prevent its packing down upon the trays. The gas enters at the bottom and, in passing up through the lime, it is relieved of its sulphur. It is then led through a meter capable of registering 100,000,000 cubic feet, and it finally enters the gasometer. Both the inlet and outlet pipes of the gasometer are provided with "drips" to catch the moisture that may be precipitated.

From the gasometer the gas is drawn by a 2-inch pipe through the "freezer," a plain cylindrical vessel, to the compressors. The freezer is connected directly with the suction of the compressors, and the rarefaction of the gas, by further lowering its temperature, condenses the moisture and dries the gas; hence the freezer is also known as the drier. The compression is done by the three single-stage compressors shown in the illustration. It will be noticed that connection is made from the compressors to both the inlet and outlet of the gas tank. This is done to provide for any emergency, such as the failure or repair of the tank, in case of which the gas could be drawn direct from the meter.

The gas is compressed to 14 atmospheres and stored in a stack of accumulators—steel cylinders, 20 feet in length, from which it is drawn off for use as required. Before entering the accumulators, however, the gas passes through a hydrocarbon tank, in the bottom of which the hydrocarbon is deposited. A certain amount of hydrocarbon is also deposited at the bottom of the accumulators, and a series of small ¾-inch pipes lead from them and from the bottom of the hydrocarbon tank to a storage tank on the upper floor, to which the hydrocarbon is forced by the pressure of the gas.

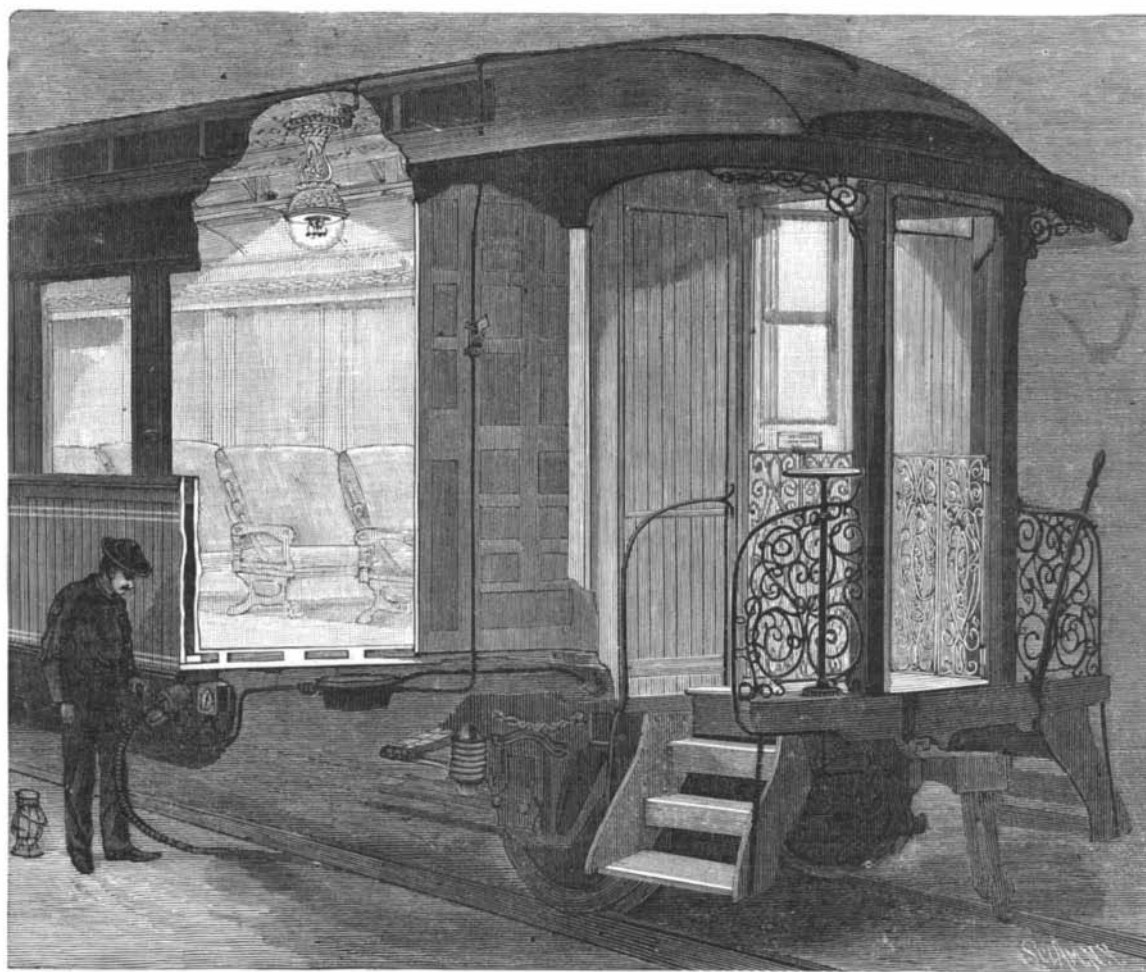
The gas is conducted from the accumulators by three 2-inch mains to the platforms of the New Haven station, where there are 33 filling valves, each of which is provided with 35 feet of hose and the necessary couplings to connect with the storage cylinders underneath

the cars. The gas in these cylinders is under a pressure of 10 to 12 atmospheres, and before it can be used at the burners the pressure has to be reduced to about an ounce. This is accomplished by passing it through a regulator placed beneath the car. The details of the regulator are shown in the accompanying sectional view. The gas enters, as indicated by the arrow, by a small valve, the stem of which acts upon a lever controlled by the pressure of a steel spring. The top of the receiver is closed by a flexible airtight leather diaphragm, which is connected by a vertical rod to the long arm of the lever just mentioned. When the gas exceeds a certain pressure, it lifts the diaphragm, thereby raising the lever and closing the inlet valve. From the regulator the gas passes to the burners at the roof of the car, where it is controlled in the usual manner.

When it is compressed the oil gas possesses an illuminating power six times greater than that of city gas. The value of the gas for the special purposes

to which it is put consists mainly in the fact that, while coal gas loses the greater part of its illuminating power by compression, oil gas loses only one-eighth. It is this quality that renders the Pintsch gas eminently adapted for car lighting and for use in buoys and beacons, or where it is subject to unusually rough usage.

DRURY Lane Theater has the largest fireproof curtain in the world. It is 42 feet by 30½ feet, made of iron and asbestos, and in case of fire can lower itself automatically in fifteen seconds.



PINTSCH GAS APPLIED TO RAILROAD CARS—SHOWING STORAGE CYLINDER, REGULATOR AND BURNERS.

the passage of the gas, while at the same time allowing the liquids to pass away.

An 8-inch pipe conducts the gas to a large condenser, located on the floor above. This is similar in construction to an ordinary tubular boiler. It has a chamber at each end, connected by a number of 3-inch tubes, around which cold water is kept constantly circulating. As the gas travels through the tubes it is cooled, and the moisture, together with the remainder of the tar, is condensed, collecting in the lower chamber, from which it drains into a drip-pot located on the

The Acetylene Gas Hazard.

The National Board of Fire Underwriters, at its recent annual meeting, approved a set of rules for governing the acetylene gas hazard, because of the attempts to introduce acetylene gas as an illuminant in various parts of the country. These rules are based upon a special investigation of the gas by Prof. Henry Morton, of the Stevens Institute of Technology, undertaken at the request of the National Board.

The special sub-committee of the board, in its report upon the work of Prof. Morton, stated that there was a growing demand from department stores and other general stores, where bicycles or bicycle sundries are dealt in, for permits to keep and sell calcium carbide and portable lamps for its use.

Acetylene gas is produced by the action of calcium carbide on water, and is rapidly coming into use for illuminating purposes. Various bodies of insurance men have attempted to control the conditions of its installation, on account of its great instability and tendency to cause destructive explosions.

The rules adopted by the National Board last week for its regulation will now be referred to the several associations throughout the country, with the hope of obtaining a uniform standard.

The more important of these new requirements for the installation and use of acetylene gas are as follows:

The generating and gas-holding apparatus, when installed for lighting buildings in the closely built-up portions of towns and cities, must be situated in an outside, fire-proof, and well ventilated building.

All generating apparatus should be in charge of persons properly instructed in their management.

No artificial light should be used inside of the building in which the gas is generated, and no heat except steam.

Bicycle and other portable lamps, in which acetylene gas is generated and supplied direct to burners, should not be approved until such lamps are so constructed that they will cease to generate gas immediately upon the extinguishment of the flame.

The storage of liquid acetylene in any building, or the use of liquid acetylene gas, should be absolutely prohibited.

In regard to the construction of the generator and gasholder, it is recommended that only wrought iron or steel, capable of resisting an internal pressure of twenty pounds to the square inch, should be used, and under no circumstances should copper or any alloy containing copper, such as brass or bronze, be employed,

since acetylene sometimes forms a compound with copper with great violence when heated or struck.

It is also recommended that the generator be so designed that it can be supplied with calcium carbide, and the residuum withdrawn without the escape of gas or the admission of air, in order to insure the prevention of dangerous explosive admixtures of air with the gas in the generator.

Technical Education in Germany and America.

The war upon which we have entered will change, has indeed already changed, our relations to foreign countries. We shall undoubtedly be drawn more deeply into the stream of competition with respect to the arts of peace. It is difficult for us to realize how much these depend upon the system of public education, nor how deficient we are in provision for certain lines of scientific and technical training which are essential to their full development. This is a lesson that England has learned on her part, through the sudden rise of German manufactures, and the lesson that Germany learned in view of the artistic superiority of her French competitor. It is evident that Germany intends to excel in manufactures, as she has in arms, and she goes about it with the same masterful thoroughness. A recent deputation from Manchester to investigate the technical schools of Germany, reports extraordinary development in electrical sciences as applied to electrical engineering industries. Darmstadt, with a population of 57,000, capital of a duchy numbering in all but 1,000,000 people, maintains a technical high school of university rank. It has the most elaborate equipment for electro-chemical studies and is attended by more than 1,000 day students above eighteen years of age. They enter after thorough preparation in the secondary schools, and the general industry of the country gains by the extended time given to scientific technical training. In this way alone can there be maintained an adequate supply of men competent to direct the great manufactories.

The development of textile schools, including all the various branches of spinning, weaving, designing, dyeing and finishing, particularly impressed the Manchester committee. Laboratory methods, they note, have been discarded in those branches in which chemistry plays a part; the equipment is on a scale approaching that of the works themselves, and affords the same kind of practice as that obtained in the spinning and weaving schools. Thus, students get a practical

and effective knowledge of the processes employed. At the renowned Crefeld school, the Prussian government has recently built and equipped a large three-story building as a dyeing and finishing school. Besides the chemical and physical laboratories, drawing rooms, lecture and testing rooms, it contains a fine chemical museum, and a library in which are to be found the technical books of all nations. The instructors are carefully selected and are men of distinction in their specialties. As proof of the esteem in which the school is held, the fact is noted that it is intrusted by the Royal Gobelin factory, in Berlin, with the dyeing of the yarns used in its special productions; also that many manufacturers send yarns to be dyed in shades that they cannot produce. The weaving school is supplied with one hundred and thirty looms. The fees for Prussians are \$30 and \$45 per session; for other Germans, \$45 and \$72; and for foreigners, \$120 and \$180. Recently it was proposed to exclude all foreigners from this and similar schools in the kingdom. The committee observe that these various arts, and especially dyeing, are matters of far greater moment to Manchester than to Crefeld. At the Berlin Municipal Higher Weaving Schools they found the students engaged in manufacturing materials for which Berlin enjoys special repute; namely: buttons, gimp, braids, gold and silver thread, etc., many of which, they regretfully observe, were formerly made at Manchester.

The trade in mantles and ladies' clothing, in which these small wares are used, amounts to \$5,000,000 annually. The jealousy with which the secrets of the manufactures are guarded is shown in the exclusion of visitors from the department of the Bureau of Education (Berlin), where models, diagrams and other means of illustration are prepared for distribution to the technical schools of the country. The commercial importance of this elaborate provision of appliances and training is illustrated by the single fact that the world's market in coloring matter and pharmaceutical products derived from coal tar is commanded by Germany. The annual value of these products is estimated at \$50,000,000. Germany controls three-fourths and sends 75 per cent of her share abroad. The feature of their system upon which the Germans themselves place great stress, and which the Manchester committee emphasize in their report, is that of thorough general instruction as preliminary to the technical. Money inducements are offered to enable young men of promise to give the time required for adequate preparation as "captains of industry."—The Independent.

RECENTLY PATENTED INVENTIONS.**Bicycle Appliances.**

BELL.—William G. Toepfer, New York city. This bell is operated from one of the supporting wheels of the bicycle and is so constructed that two gongs shall be alternately operated by a single trip-wheel. To opposite sides of a rocking support, attached to the frame of a bicycle, the gongs are fastened. The trip-wheel carried by the support engages with the wheel of the bicycle. Levers are connected with the striking arms of the gongs, and are fulcrumed on the pivot of the rocking support. Trip devices carried by the trip-wheel at its opposite sides extend into the paths of the striking arms and are arranged to operate the latter.

MUD-GUARD.—Charles L. and Alfred J. Seaguest, Portland, Ore. The mud-guard provided by this inventor is designed to be attached to the axles of bicycle wheels and to prevent mud from flying against the rider. The mud-guard has a length of wire bent at an intermediate point. A web attached to the wire adjacent to the bend forms the mud-guard proper. Two additional wires are respectively connected with the arms of the first-named wire. Each of these additional wires and each arm of the first-named wire are embraced by a link. Each end of the first-named wire and the free ends of the second-named wires are bent transversely to fit into the tubular portions of two clips by which the guards are held in place.

RAILWAY-ATTACHMENT FOR BICYCLES.—Charles E. Nichols, Milan, Wash. This invention provides for an attachment by which an ordinary bicycle may be ridden upon railway rails. The attachment comprises essentially a balancing-wheel and a guide-wheel. The balancing-wheel is unflanged and travels upon the rail opposite that over which the bicycle runs. The guide-wheel is flanged and located in advance of the steering-wheel. The wheels are connected to the frame by bars or rods, means being provided for uncoupling the latter. A cord enables the rider to lift the guiding wheel from its track.

Mechanical Contrivances.

ADDING AND RECORDING APPARATUS.—William J. Ensworth, Erie, Pa. The purpose of this invention is to provide an apparatus for registering and recording figures, and to such an end it embodies printing devices for impressing individually the numbers and registering wheels for casting the individual numbers into a total or aggregate sum. The printing devices comprise a series of wheels with printing keys, adjustable by turning the wheels and coating with an inking ribbon to effect an impression. The registering devices comprise peculiarly constructed registering wheels, always serving to show the sum of the numbers impressed by the printing devices. The two divisions of the apparatus are geared with each other, so that the registering wheels act promptly upon the initial movements of the printing wheels. The machine is useful in banking and mercantile establishments, where it is desirable to dispose many individual numbers in a single column and at the same time to add them into a sum or total.

COMBINED ORE CONCENTRATOR AND SLIMER.—Franklin W. Harlow, Eureka, Cal. This apparatus is designed to separate the tailings from the ore in a very simple manner, without causing a great running expense. The apparatus is provided with a bed or pan having a pocket in its bottom and outlet funnels having spouts, the outer ends of which extend through the bottom of the bed at the pocket. The funnel-bodies are held above the bottom of the bed and extend upward to allow the concentrates to settle in the bottom of the bed and to permit the water and tailings to flow down through the funnels. A caisson is arranged over each funnel and is open at the top and bottom. The lower end of each caisson is located a short distance above the top of the corresponding funnel-body. A hopper, located beneath the bed, receives the material passing through the funnels and an endless apron traveling beneath the hopper receives the material discharged upon it.

Miscellaneous Inventions.

ELECTRIC ARC LAMP.—Fredric Wright, Newburg, N. Y. The object of this invention is to provide a lamp having a series of carbons arranged in magazines and having a central main for feeding the carbons automatically one after another as they are consumed. The carbon-magazines are mounted on a casing and carbon-holder tubes extend from the magazines and converge. Carbon locking plates are located on the tubes. An arrangement of solenoids and levers automatically controls the locking plates.

BOILER-FLUE CLEANER.—William Senke, Harrison, Kan. The purpose of this invention is to provide a flue-cleaner in which steam from the boiler may be discharged through a suitable head in the interior of the flues to loosen and remove all adhering foreign matter. The head has an outer section flaring toward and approximately to its front edge. An inner section screws into a nipple formed in the rear of the flaring portion and is closed at its outer end. This section, furthermore, flares forward to a point near its front edge, where it is given a strong outward flare and closely approaches the beveled edge of the outer section, forming therewith a steam passage provided with annular series of openings through which steam passes to flow into the space between the shells.

GARBAGE-CLOSET.—Cornelia S. Robinson, New York city. This garbage-closet is formed in the wall of a building and has a portion of its outer wall inclined downwardly and outwardly, forming a hood projecting out beyond the outer face of the wall of the building and having its bottom closed by a screen. The closet is provided with a flue at the top to carry away the odors.

VENTILATING ATTACHMENT FOR WINDOWS.—Karen C. Sanborn, Brooklyn, N. Y. This attachment is adapted to be fitted in the space between the inclined lower sash and window-frame, provision being made for protection against the entrance of insects. The window-frame is provided with stop-heads hinged to the inner edge of the frame and adapted to be carried parallel with the inner vertical faces of the sides of the

window-frame. The lower sash, held to slide in the frame, can be inwardly inclined when the stop-heads are swung inwardly on their hinges. Between the space produced between the sash and frame the attachment is fitted. This attachment comprises a framework covered with a perforated material, locking devices being provided to secure the attachment in place.

ANTI-RATTLING NUT-LOCKING DEVICE FOR THILL-COUPPLINGS.—Charles T. Redfield, Glenhaven, N. Y. The purpose of this invention is to provide a device which can be easily applied to the pivot-bolt of a thill-coupling. When the nut of the bolt is screwed up, it will force the device to a positive bearing on the barrel of the coupling and at the same time hold the nut on the bolt in the adjusted position, the bearing of the device on the barrel and its bearing on the nut being independent in action. The device consists of a spring body provided with a tongue-section between its ends and with wings at the ends, one adapted as a means of support and the other for locking engagement with the nut of the pivot-bolt of the thill-coupling.

EXTENSION TABLE.—Charles Poupon, Eagle Lake, Fla. This invention provides for an improvement in extension tables, particularly those which are circular in form, the purpose being to enable a table to be adjusted to any diameter within its capacity by turning a crank or adjusting wheel. The table has its top formed of a large number of sectors, so connected and guided that they may be moved radially inward and outward. The central portion of the table is formed of a thin metal plate covering the sectors, from beneath which they project when the table is extended. In connection with the sectors, adjustable rails or rings are used, which support the outer ends of the sectors, and to which are attached the adjusting means and legs for supporting the outer ends of the sectors. The sectors are also provided with springs to separate them when they are extended and also with a flexible connector by which undue separation is avoided. The bars attached to these rings and to the legs lie radially. The bars are toothed and engage with a central pinion by which all of the bars are forced outwardly or inwardly at the same time and at the same rate.

FOLDING UMBRELLA.—Frank E. Stover and Frank G. Grove, Luray, Va. This invention is an improvement upon that class of folding or collapsible umbrellas in which the ribs are made in sections adapted to slide on one another, rendering it possible to fold the umbrella into half its normal length. The umbrella is provided with a stick formed of telescoping sections provided with longitudinal slots, the slot of the inner section being the longer and sliding in the outer section and formed of two members connected by a link. Ribs are carried by the outer stick section and are formed of sections sliding upon one another. Runners are located on the outer stick section. Two sets of stretchers are pivoted to the runners and to the lower rib-sections. A latch is pivoted in the slots of the stick sections and serves to lock the lower runner in position and the sections of the stick together when the umbrella is opened. A cover is secured to the lower rib sections and is provided with a central opening in which the upper end of the inner stick section is free to slide.

APPARATUS FOR PLAYING DUPLICATE GAMES OF CARDS.—George L. Castner, Brownsville, Tenn. In this apparatus a tray is provided with holders for the reception of the cards. An extension from the body of the tray receives the index projections of a guide board for the purpose of determining throughout the game a certain preferred position of the tray. The projection from the tray has indicators whereby it may be readily determined whether the reverse or the obverse side of the tray is uppermost. This device is of service in playing games similar to duplicate whist.

BINDING FOR BLANK BOOKS.—William B. Boorum, New York city. This invention is an improvement in temporary or refillable bindings for blank books and is particularly intended for use in connection with pads or loose sheets, to form a book for the reception of memoranda. The binding comprises boards forming the sides of the cover, one of the boards being of the full width of the book and the other being narrower. Flexible connections are provided between the boards. There are also means for securing an intermediate portion of the flexible connection to one side of the book-body near its back, whereby either board may be folded about the back and lie smoothly against the other.

BELT-BUCKLE.—Emma B. Winter, New York city. The object of this invention is to provide a buckle which can be conveniently attached to and adjusted on a belt without requiring any sewing. The invention consists principally of a buckle-frame provided on its back with a hook, a toothed bar for engagement with the belt material, the bar being spaced from the back of the frame, and a plate projecting at one side and likewise spaced from the back of the frame, for the passage of the belt between the frame and the plate and for doubling up the end of the belt over the plate, finally to engage the doubled up end with the teeth of the bar.

BOTTLE STOPPER.—John F. Perry, Chicago, Ill. The purpose of this invention is to provide a bottle stopper of simple and cheap construction, which shall require neither the use of external wires or bails, nor the use of a corkscrew, and which shall tightly close the bottle without allowing the contents to come into contact with cork or rubber. The stopper consists of a rigid top-portion with lugs on its sides and a lower elastic plug portion with a rigid facing on its lower end. The bottle-neck has vertical channels and transverse locking grooves, a shoulder lower down in the bottle-neck being adapted to receive the rigid facing on the lower end of the elastic plug to compel the lateral expansion of the plug.

DOOR-HANGER.—James E. Owen, John C. Gabel, Jr., and George F. McKinney, Onarga, Ill. According to this invention a hollow track is provided with a slot in its bottom and with brackets extending around the track from one side of the slot to the other. A carriage is held to travel in the track and consists of a body-bar which extends within the slotted portion of the track. Wheels at each side of the carriage travel in the bottom portion of the track. A drop-door is connected to the carriage by hinges, each hinge consisting of three members