

STEAM BOILER NOTES.

On January 9 the boiler of engine 167, on the north bound Illinois Central suburban train from Hyde Park, Ill., exploded as the train was pulling into Oakland Station. The end of the engine was blown out, and a stream of glass, splinters, and broken iron was sent into the car and upon the passengers. The engineer, John Glover, the fireman, Edward Scanlon, and a boy were badly burned and cut. The boiler was carried several hundred feet through the air, and came down through the roof of a workshop. It is a miracle that nobody was killed. The boiler was defective.

A boiler in Shaw Brothers' Tannery, at Jackson Brook, Me., exploded early Saturday morning, January 21, killing Thomas Lacy, the engineer. The exploded boiler was thrown fifty feet. Two other boilers were lifted from their bed. Two smokestacks were thrown down. The boiler house and furnace were wrecked.

The tug H. P. Farrington, the property of Cornell's Tow Line, was blown up at 7 o'clock P.M., January 23, while lying at Peck's Dock, Haverstraw, N. Y., and totally destroyed. The crew consisted of seven men, all of whom were on board at the time. Pieces of timber were scattered over the neighboring brickyards, and a coal-bunker deck ring was blown a distance of 300 feet or more. A dozen or so of the boiler tubes, which were 4 inches diameter and 9 feet long, were the only parts of the boiler that could be found in the vicinity, all else, with the boat itself, sank in the river and were soon covered with ice. The shock from the explosion was felt in many of the houses in the village, which is about one-quarter of a mile from Peck's Dock. The following persons were killed: Albert Hennion, second engineer, David Colton, fireman, and Lawrence Connelly, cook.

A boiler exploded in Cañon City, Cal., on Wednesday, January 25, resulting in the death of two men. The boiler was located at a shaft of the Cañon City Coal Company. The result of the explosion was the killing of a fireman outright and injuring a blacksmith so badly that he has since died. The engineer had a leg broken, and was badly scalded. The boiler was thrown a distance of 300 yards.

One of the boilers in the shade cloth factory owned by Irwin & Sloan and others, exploded December 27, before daylight in the morning. The middle of the building was demolished. Captain William Doran, night watchman, was instantly killed. He was the only person in the works at the time. The boiler had been shut off for cleaning on Christmas Day, and the steam stop valve had not been opened when the explosion occurred. The shock was terrific, and parts of the boiler were scattered over a large area. The boiler was under the inspection of an insurance company that had some \$6,500 at risk. The loss on the building and machinery is about \$15,000.

The boiler in the steam mill of the Kennebec Framing Company, at Fairfield, exploded, Jan. 28, with terrific force. A son of ex-warden Rice was killed, and John Avery, the foreman, Lemar, the fireman, and Isaac Farley, the engineer, were buried in the ruins. George McKeown and John Smith, a foreman, were wounded, and several others slightly injured. The underwork of the mill took fire. The accident is supposed to have been caused by a lack of water in the boiler. The explosion was accompanied by a deafening report, which jarred the houses all over the village and caused many to think an earthquake was taking place. The boiler, an old steamboat boiler, had been patched a number of times, and had been considered, it is said, very dangerous for months. The company was intending to put in a new one in the spring. The engineer says he had repeatedly told the manager of the great danger of an explosion. The management is greatly blamed by the citizens.

The boiler in the Belleville (Ill.) Nail Mill exploded, January 30, and almost totally destroyed the building. Several persons were seriously injured, William Davis probably fatally. Damage, \$20,000; insured. Two hundred men and boys were thrown out of employment.

The Lalande Astronomy Prize.

At the annual meeting of the French Academy of Sciences February 6, the Lalande Astronomy Prize was awarded to Dr. Lewis Swift, of Rochester, N. Y.

The record of Dr. Swift as a scientific observer adds a new illustration to the truth, which students should never forget, that earnest and persevering efforts count for more than money and opportunity as elements of success. Most of Dr. Swift's work was done with the rudest appliances of his own making, used under anything but favorable conditions.

Movement of Cars on Brooklyn Bridge.

The report of the Bridge Committee on Transit recommends the circulating railway system for the Brooklyn Bridge. This system is operated by an endless wire rope, terminating in an elevated platform at the height of the elevated railroads in this city, and extending 600 feet from the terminus of the bridge. By this system the cars would be passed in one direction on one track and in the opposite direction on another track. The report of the committee concluded with a favorable opinion of the system by Engineer Roebling. The platforms, etc., would cost, according to the engineer's estimate, \$268,980; engines, boilers foundation for machinery, sheaves, ropes, \$73,439; boiler house and machine shop, \$12,000; rolling stock, comprising thirty-four cars, having side doors, \$4,125 each, making \$99,000. The total cost of the circulating system would be about \$500,000, including an estimate for contingencies.

TEN YEARS' PROGRESS IN IRON AND STEEL PRODUCTION.

The advance sheets of the census report on the production of iron and steel, prepared by special agent James M. Swank, show an encouraging progress during the decade since the preceding census, both in the quantity of the product and in the efficiency and economy of the processes employed.

The report covers only productive establishments, such as turn out pig iron, rolled iron, steel in crude state, blooms, and bar iron. A comparison of the main items for the last two census years shows as follows:

	1880.	1870.	Incr. p. ct.
Establishments.....	1,005	808	24.38
Hands employed.....	140,978	77,555	81.78
Wages paid.....	\$55,476,785	\$40,514,981	36.93
Capital invested.....	\$20,971,884	\$21,773,074	89.68
Value of materials.....	\$11,271,150	\$35,526,132	41.13
Value of products.....	\$296,537,685	\$27,293,696	43.12
Tons produced.....	7,265,140	3,655,215	98.76

It will be noticed that the increase in quantity is much greater than the increase in cost, indicating greater economy in the methods employed. When the values have been reduced to a gold basis (the gold dollar of 1880 being worth nearly one-fourth more than the current dollar of 1870), it is found that the actual increase in wages was 68.8 per cent., while the gold value of the products was larger in 1880 by 76.4 per cent. The largest increase in quantity was in the various grades of steel, as will be seen from the following analysis of the products, the quantities being tons of 2,000 pounds:

	1880.	1870.	Incr. p. ct.
Pig iron and castings.....	3,781,021	2,062,921	84
Rolled iron.....	2,853,243	1,441,829	63
Bessemer steel.....	889,896	19,408	4,486
Open hearth steel.....	93,143	—	—
Crucible steel.....	70,310	23,069	151
Blister and other steel.....	4,956	2,285	117

The substitution of steel for iron in rails and other products caused a decline of 35 per cent. in the output of forges and bloomeries.

The great bulk of the product of iron and steel (nearly eight-tenths) is credited to Pennsylvania, Ohio, New York, Illinois, and New Jersey; and more than half of all was produced in fourteen counties, as follows:

Counties.	Tons.	Counties.	Tons.
Allegheny, Pa.....	848,146	Mercer, Pa.....	132,881
Lehigh, Pa.....	324,875	Rensselaer, N. Y.....	177,967
Northampton, Pa.....	322,882	Montgomery, Pa.....	168,628
Cambria, Pa.....	260,140	Lackawanna, Pa.....	151,273
Cook, Ill.....	248,479	Milwaukee, Wis.....	128,191
Dauphin, Pa.....	235,676	St. Louis, Mo.....	102,644
Mahoning, Ohio.....	219,957		
Berksh, Pa.....	213,580	Total (fifteen counties).....	3,783,673
Cuyahoga, Ohio.....	210,354		

The greatest advance during the decade was made in Cook County, Ill., which in 1870 produced only 25,000 tons of rolled iron.

In the five States named, where most of the iron workers are employed, the wages of skilled and unskilled labor in the various branches were:

	Pa.	Ohio.	N. Y.	Ill.	N. J.
Blast furnaces, S.....	\$1 64	\$1 84	\$1 77	\$2 17	\$1 75
Blast furnaces, U.....	1 09	1 25	1 14	1 3	1 30
Rolling mills, S.....	3 03	3 87	2 93	3 67	2 73
Rolling mills, U.....	1 17	1 32	1 22	1 25	1 22
Bessemer works, S.....	2 46	3 96	2 18	5 00	—
Bessemer works, U.....	1 17	1 34	1 07	1 15	—
Forges and blooms, S.....	2 43	—	2 48	—	2 24
Forges and blooms, U.....	1 11	—	1 14	—	1 19
All works, S.....	\$2 32	\$2 89	\$2 48	\$3 43	\$2 32
All works, U.....	1 13	1 30	1 18	1 27	1 21

The average wages of skilled labor throughout the country was \$2.59, and of unskilled labor, \$1.24.

Foreigners in our Cities.

The numbers, nationalities, and increase of the population of our principal cities are discussed in a recent census bulletin.

The first five in order of population are New York, with a population of 1,206,299; Philadelphia, 847,170; Brooklyn, 566,663; Chicago, 503,185; and Boston, 362,839.

In 1870, New York had a population of 942,292; Philadelphia, 674,023; Brooklyn, 396,099; Chicago, 298,977; and Boston, 250,526. During the past decade New York has added to its population more people than now reside in Cincinnati, and more than Boston had ten years ago. There are somewhat over 21,000 more women than men in the city, and 249,000 more natives than foreigners. The proportion of natives to foreigners in Philadelphia is much greater than in New York, or roughly three to one against three to two in New York. In Brooklyn the native proportion is somewhat more than double the foreign.

The second group of cities comprises St. Louis, 350,518; Baltimore, 332,313; Cincinnati, 255,139; San Francisco, 233,959; and New Orleans, 216,090.

In proportion of foreign population San Francisco ranks with Brooklyn; St. Louis and Cincinnati about with Philadelphia. In Baltimore the natives are nearly six times as numerous as those of foreign birth. Further south the native born overwhelmingly predominate.

Method of Purifying Arsenical Copper.

The author operates on a basic hearth of lime and tar, according to the process of Riley and Gilchrist, and at each operation he uses a false hearth of limestone mixed with peroxide of manganese. During the fusion of the ingots this false hearth is heated and gives off carbonic acid and a part of its oxygen. These gases traverse the mass of half melted copper. When the bath is sufficiently liquid the lime and the manganese oxide thus formed rise through the copper and dissolve the arsenic acid, which passes into the slag. To expel the last traces the copper is allowed to become pasty in a current of air, and is then remelted with the addition of basic fluxes till entirely purified.—J. Garnier.

Proposed Saving of Time in Atlantic Transit.

The time required for the conveyance of mails from New York to London is given as follows: New York Post Office to Sandy Hook light, 3h. 30m.; Sandy Hook to Queenstown (best average time 1881), 8d. 13h. 45m.; delay of mails at Queenstown, 1881, 3h. 30m.; Queenstown to London, 22h.; total, 9d. 20h. 45m.

It is proposed to better this time by means of swift steamers plying between the eastern extremity of Long Island and the new port of Milford Haven, in Wales. The time by the new route is estimated as follows: New York to Fort Pond Bay, via Long Island Railroad (110 miles), 2h. 30m.; transfer at Fort Pond Bay, 1h. 30m.; Fort Pond Bay to Milford Haven (southerly and lowest route 2,880 miles, at 18 miles an hour), 6d. 16h.; transfer at Milford Haven, 1h. 30m.; Milford Haven to London (322 miles), 8h.; total 7d. 5h. 30m. A speed of 20 miles an hour on the ocean, which Mr. Pearce, the English shipbuilder, offers to guarantee to vessels of his construction, would reduce the time to 6d. 13h. 30m. For seven years the construction of docks at Milford Haven has been going on, and they are now nearly ready to receive the largest steamships. They were designed by Sir E. J. Reed, late Chief Constructor of the British Navy. The dimensions of the docks are as follows: Total available dock area, 60 acres; lock 500 feet long by 70 feet wide; graving dock, 710 feet long, 96 feet wide; small graving dock, 270 feet long, 46 feet wide; depth over sills, high water spring tides, 36 feet, and at high water heaps, 27 feet; depth of water in docks, 28 feet. The cost of the docks has been about \$2,650,000.

The Past Year's Work in the Patent Office.

The report of the Commissioner of Patents for the year ending Dec. 31, 1881, bears abundant evidence that there is no falling off in the activity of our inventors. The number of patents issued was 17,620, against 16,584 for the preceding year. The total number of applications requiring investigation and action was 30,242. Of these 26,059 were for patents for inventions, designs, and reissues, and 4,183 were caveats filed, applications for registration of trade marks, labels, etc. The total receipts of the office during the year from all sources were \$853,665 89, and the expenditure \$605,173 28. The total balance in the Treasury of the United States on account of the patent fund on January 1, 1882, amounted to \$1,880,119 32.

The Commissioner urges upon Congress the pressing necessity of increasing the examining force of the office, and providing more room for the use of the office.

Census of the Oyster Industry.

For the first time the oyster trade has received appreciative treatment by a census bureau. The investigation of the industry was committed to Mr. Ernest Ingersoll, whose report has just been published, covering the history and present condition of all the oyster grounds from Canada to the Gulf of Mexico, besides those on the Pacific coast. In the census year of 1880 the capital invested in the oyster industry was \$10,583,295. The number of bushels of oysters produced was 22,195,375. Their value to the producers was \$9,034,861, and their value as sold was \$13,438,852. The number of persons employed was 52,805, and there were used in the work 4,155 vessels and 11,930 boats, valued at nearly \$4,250,000.

The total wholesale value of the oysters annually sold in Boston is \$705,000; the value of the oysters produced in Narragansett Bay is \$680,000; the value of those sold in New Haven Harbor is \$480,000; in the East River and Peconic Bay, 708,000; on the south shore of Long Island, \$400,000; in New York Bay, excluding New York city, \$375,000; in New York city, \$2,758,000; on the ocean shore of New Jersey, \$310,000; in Delaware Bay, \$2,425,000; in Philadelphia, \$2,750,000; and in Virginia nearly \$2,000,000, and about \$125,000 will cover the value for the remainder of the Southern coast line, not including the Gulf line, where the value slightly exceeds \$300,000.

Wine from Beets.

The loss of vines through the ravages of the phylloxera is forcing the wine makers of France to strenuous efforts to find a substitute. M. A. Delenil, a member of the Agricultural Society of France, insists that an acceptable substitute has been found in a variety of red beet root, which he describes as "unrivaled in the whole world for its incomparable qualities, which will in time replace all that we have lost in the vine. Beet root produces alcohol of superior quality; why, then, should not its pulp, treated like the must of the grape, produce an equally luscious beverage? In fact, this has been done; the very sweet red beet root produces by fermentation a wine quite as good as many of the *soi-disent* wines of our southern vineyards. It possesses the additional advantage of accommodating itself to all soils, and flourishes in most climates." All this may be true; yet we fancy that American wine users at least will prefer the juice of their own grapes.

Sir William Palliser.

Major Sir William Palliser, widely known for his inventions in ordnance and armor, is dead. Among his inventions are the projectiles which bear his name; the system of converting smooth bore cast iron guns into rifled compound guns; the screw bolts used in attaching armor to forts and iron clad vessels; and many improvements in the construction of heavy wrought iron rifled cannon. He was born in Dublin, in June, 1833.

The Teleradiophone.

M. Mercadier, the eminent French electrician, has ingeniously adapted the photophone of Professor Bell to telegraphy. In the photophone a ray of light is reflected by a mirror, so as to fall upon the sensitive surface of a "selenium cell" joined up in the circuit of a voltaic battery and a speaking telephone. When the light strikes the cell its electric resistance is diminished, and a wave or pulse of current flows through the telephone, causing it to sound. By eclipsing the ray of light a great many times per second, this sound can be exalted into a continuous hum, like that of a tuning fork, and by again occulting the intermittent ray for long and short intervals corresponding to the flashes of a signaling lantern, this hum or drone can be broken up into audible signals. Thus, if the Morse telegraphic code is used, a short occultation, producing a short pause in the note of the telephone, will stand for a "dot," and a long occultation, producing a long pause, will stand for a "dash."

This photo-electric telegraph is realized by M. Mercadier with the help of a gas flame forming the source of light, a mirror, and lenses to direct its rays upon the selenium cell in circuit with a battery and the line wire. The beam is regularly eclipsed by means of a rapidly rotating disk, perforated with a circle of holes, and the telegraphic occultations of the intermittent beam are effected by means of a signaling key, which interposes a dead screen in the track of the light whenever the key is pressed. These apparatus form the transmitter; and the receiver at the other end of the line is, of course, the telephone, which is fitted with a resonator to re-enforce the sound. There is no gain in such an arrangement over the ordinary telegraph now in use; but it has the merit of lending itself to multiple telegraphy. Thus by multiplying the number of transmitters at one end of the line and the number of telephones at the other, several different messages can be sent along the same wire at once. In order to do this it is only necessary to rotate the eclipsing wheels at different speeds, so as to produce notes of different pitch in the receiving telephones, and to fit each resonator so as to enhance a particular note. Then, although the complex current flows through all the telephones in turn, each telephone will only render to the ear of the clerk the particular note for which he listens, and the makes and breaks of that note will be interpreted as the message. Not only can several messages be sent in one direction along the same wire together, but from opposite ends simultaneously without confusion, and M. Mercadier reckons that with 10 transmitters and 10 receivers at each end of a line he can send 200 dispatches of 30 words each per hour, or 100 words per minute, in either direction. The effects of induction, so troublesome in speaking by telephone, are not experienced in this process, owing to the employment of musical notes and resonators.

ADER'S MAGNIFYING TELEPHONE.

M. Ader showed, at the Electrical Exhibition in Paris, an instrument that possesses the power to magnify transmitted sounds. If a song is hummed in front of the microphones attached to the instrument, the song will be reproduced as a full quartet.

This instrument is formed of four trumpets whose mouthpieces are attached to a vibratory diaphragm (see illustration), but its interior arrangement has been kept secret by the inventor, as it is the only known instrument that is able to increase sounds transmitted through the air.

It is rightly named a microphone, as it does for the ear what the microscope does for the eye.

At present it is only able to reproduce musical sounds, but M. Ader hopes soon to magnify and reproduce articulate speech of the human voice, so that a person whose hearing is defective can hear without placing the instrument to his ear. He may possibly do this, for all telephones commenced by transmitting musical sounds only.

If M. Ader succeeds, instead of the present style of telephone, there may be telephonic offices and rooms where one can sit and talk comfortably to any distance without moving from his chair.—*La Lumière Electrique.*

More Money in Firearms and Dirks than in Farming Implements.

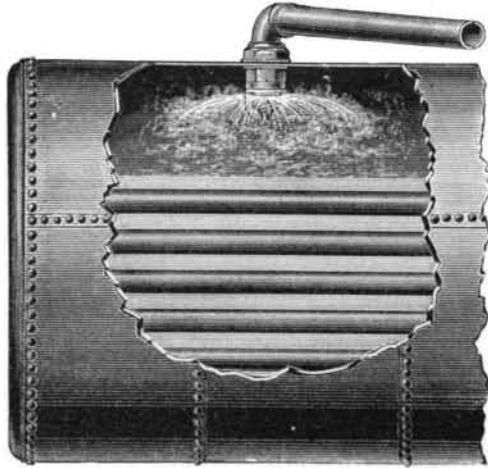
The Montgomery *Advertiser* publishes a partial list of subjects of taxation in Alabama, and makes, in the main, a fine showing; but three items in the schedule strike us as being at least queer. These items are: 1st, mechanical tools, \$238,509; 2d, farming implements, \$77,100, making a total value of farming implements and mechanical tools of \$305,609; 3d, guns, pistols, and dirks, \$354,250! Or about \$49,000 more invested in guns, pistols, and dirks than in farming implements and mechanical tools combined. No county in the State reports less than \$1,000 worth of guns, pistols, and dirks, and the average of all the counties is over \$5,000, while some of the counties have only \$20 worth of mechanical tools, and only twenty-nine counties return over \$1,000 worth of farming implements, and fourteen counties less than \$100 worth,

and some of them as little as \$25. The only fair explanation of these figures must be the fact that only a very small fraction of the mechanical tools and farming implements are listed by the receivers of tax returns, for there is no year when the people of Alabama do not buy five times the amount named of farming implements.

Guns and pistols being surplus assets, they are more fully returned. We all know they are infinitely less used.—*Columbus (Ga.) Times.*

SUPPLYING STEAM BOILERS WITH WATER.

It has long been the common practice of steam engineers to supply boilers with water below the "water line," it being the general impression that to obtain the best result, the temperature of the water should be gradually raised to the boiling point. As a consequence, it is found that most

**HALL & SONS' SPRAY FEED-WATER HEATER.**

boilers receive the feed water at the coolest part, generally near, if not quite, at the bottom of them. As an economy so far as relates to non-condensing engines, it is usual to heat the feed water by exhaust steam to probably 180° Fah. before it enters the boiler, whenever practicable.

If all water was free from impurities, either in solution or suspension, as lime, sulphur, acids, mud, and other matter, and a uniform temperature always maintained, it would probably be a satisfactory method in most instances, but such existing examples are rare exceptions. Almost all waters throughout our land contain impurities, which are separated during the process of boiling, but as the water is admitted in volume, the temperature is raised so slowly the particles of matter unite and adhere to the exposed surfaces, forming a coating called scale. When this coating is formed, on account of its non-conducting nature, which compared with iron is as 1 to 37.5, it involves a loss of fuel in direct ratio with its thickness. When it is considered

Within the last few years, however, there has been some progress made in feeding steam boilers, in quite an opposite manner from the old custom, and the result seems to be satisfactory and combining several advantages. Instead of feeding in the coolest part of the boiler in volume, it is the later practice to feed in the steam space above the "water line" in the form of spray or in a finely divided state, and by contact of the water in this form with the high heat caused by the steam pressure, the water is heated (as it descends through the steam towards the water line) fully to the boiling point, thus practically distilling it and separating the impurities contained in the water, which assume a finely granulated form usually, and which, settling, can be readily disposed of at the mud valve.

Owing to the fact that in the use of the best devices for this purpose no water comes in contact with the shell or tubes of a boiler, until it is heated as hot as that at the water line, it follows there is less unequal expansion, the danger from cold currents is overcome, and "shell cracks" are avoided, thereby effecting a saving in boiler repairs, and increasing the factor of safety. This system has been adopted in many sections where almost every other means failed to be of benefit.

At Syracuse, N. Y., it has been used successfully upon the hardest lime water which heretofore baffled every means employed. Upon the muddy waters of our Western rivers it has been well tested and has given entire satisfaction, as also on mineral and mine waters of almost every known variety it has proven superior to the old way in all cases, effectually preventing scale formation and reducing boiler repairs and fuel expenses to a minimum. Supplying water to boilers in the steam space cannot be considered a late idea, but the early efforts in this direction were crude, the devices used were imperfect and could not be depended upon, being designed generally by parties that had not given the subject the study it deserved. It is unnecessary for us to recall the numerous failures, but each was a step forward and in the right direction, until now the system has been perfected, and from its adoption has received due appreciation from thoughtful, practical steam users. Among the devices which are rapidly growing in favor and receiving general approval is the patent "spray" feed-water purifiers, shown in the engraving, and manufactured solely by Hall & Sons, Buffalo, N. Y., who may be addressed for further information.

MECHANICAL INVENTIONS.

An improved regulator for spinning-mules has been patented by Mr. Lazarus B. Sanford, of Greenville, S. C. This invention has reference more particularly to improvements in mechanism for regulating the rising movement of the quadrant-nut, the object being to provide improved means for automatically regulating the tension of the yarn while the cop is being wound.

An improved device for tightening belts, especially elevator bucket belts, and giving them the required tension, has been patented by Mr. John F. Wilson, of Camden, N. Y. The invention consists of two frames, which have screws mounted in their ends for drawing these frames together or separating them, on which frames serrated or ribbed segmental interchangeable belt clamping blocks, with handles for operating them, are pivoted, which pivots can be withdrawn to remove the clamping blocks from the frame.

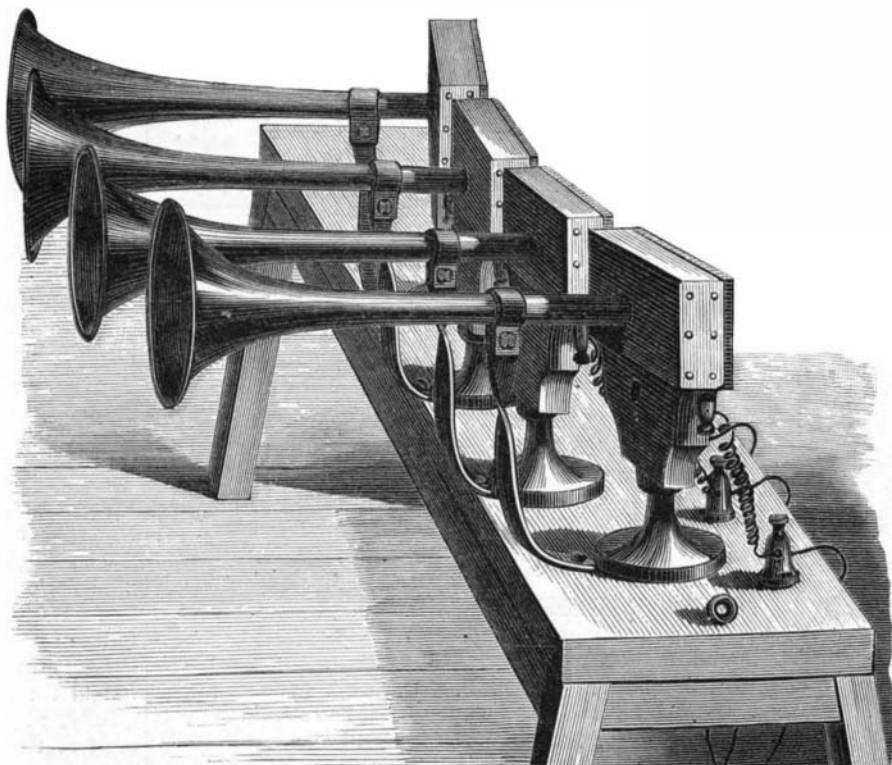
Mr. Albert D. Canfield, of Arlington, Vt., has patented an improvement in that class of car wheels which have steel treads with a filling of less expensive material. The invention consists in the arrangement of the segmental sections and the wedge-shaped sections, and of the manner of securing them to each other and to the hub.

An improvement in tricycles has been patented by Mr. Samuel N. Silver, of Auburn, Me. The object of this invention is to provide a new and improved tricycle, or self-propelling vehicle, which is so constructed that it can be propelled, steered, and controlled very easily by the occupant.

The tricycle is provided with two pivoted foot levers connected with arms loosely mounted on the axle, and provided at the outer ends with pivoted pawls engaging in notches in disks loosely mounted on the axle, and provided with friction clutch-dogs catching on the inner surface of the circumferential flange of a disk rigidly mounted on the axle, so that when

the foot levers are depressed springs on the axle connected with the loose disks, and other springs also connected with these disks, will be brought in tension, and when the pawls are released from the disks the springs revolve the loose disks which catch on the rigid disk, thereby rotating the axle and propelling the vehicle forward.

A combined tablet and easel has been patented by Messrs. Andrew B. Banghart and Charles H. Treat, of Frankford, Del. The object of this invention is to produce tablets to be painted or ornamented, and to combine therewith easels for supporting the tablets in such a manner that they can be readily taken apart and packed in small space for storage and transportation.

**ADER'S MAGNIFYING TELEPHONE.**

that scale one-eighth inch thick requires 28 per cent more fuel to produce the same effective heat than when the boiler would be a clean one, it of course becomes a subject for consideration and of interest to every steam user, though it must be confessed that many manufacturers do not give their boilers the attention required for economy and safety.

It is not our purpose to enumerate the attempts that have been made to effectually overcome the scourge called scale, as there have been so many inventions, mechanical cleaners, lime catchers, etc., not to mention compounds, oils, and chemical preparation, which, in most instances, fail to be of any benefit, it merely showing the urgent need of some system which will effectually meet the requirement in all cases.