Students as Conductors in Philadelphia,

The Electric Engineer says that "during the past summer between 30 and 40 students of Jefferson Medical College, the Philadelphia College of Dentistry, the University of Pennsylvania and other colleges in this city obtained employment as conductors on the cars of the People's Traction System of Philadelphia. All of the young men came from outside the city, and were working their way through college. The last of them handed in their resignations last week, which the company accepted with regret, for the young men had proved to be the best conductors in its employ. An official of the company said the students were thoroughly honest, intelligent and polite, and as their desire was to earn as much money during the summer as possible, they were always willing to work extra hours and take out special cars. They lived economically and have probably saved something like \$130 each, which will go a good way toward paying their college expenses next winter. One of the students has almost concluded not to go back to college, he likes railroading so well, and is still in the employ of the company."

THE MAGNETIC BICYCLE.

In some parts of the country there are malicious persons who throw tacks in the roadway to annoy bicycle riders by perforating the pneumatic tires. To meet this difficulty it has been proposed to attach a magnet in front of the forward wheel, with the object of picking up the tacks as the machine rolls along.

use of this idea in the accompanying sketch. Here the cyclist is represented as carrying such a powerful magnet that it not only picks up tacks, but even draws out the nails from the shoes of passers-by.

Obstinate Thumping.

Sometimes an engine which usually runs well develops an obstinate pound or thump, which persists in spite of all the doctoring that can be done to the machine. In vain the engineer will go from the wrist pin to the crosshead, and from eccentric to bearing. Even the flywheel and the manner in which it is keyed upon the shaft will be investigated, to see if the thump is located therein. After all these things have been tried in vain, just give the engine a trifle more compression and note the result. Probably it will cure or make it worse. In the latter case change the valve again and give a little less compression than there was before. In nineteen cases out of twenty,

do the business. The philosophy of the business is of experience." this: The compression is too little or too great to allow the engine to run smoothly over the center; and at that point the piston gives a "yank," which causes wrist pin and connection and sometimes the main bearing to vibrate to the extent of the lost motion, forming the thump or pound, which is so objectionable to the good engine runner.

Should Your Boy Go to College ?

Is a college course the best training for a boy deigned for a business career? Upon this important ity. Mr. Flower invites a glance at the careers of some question good judges differ. The editor of Munsey's, believing that those entitled to discuss this question with authority are rather the practical men of action Lincoln. He says: than the theorists of educational science, has collected and presented the views of some of New York's leaders | can fall to the lot of a boy endowed with a clever and of affairs on this subject. In his introductory remarks active mind and a wholesome thirst for knowledge. the editor says: "It might perhaps be thought that in the trial of will enrich him in the long run, one way or another. such a cause each juror's verdict would depend upon his own personal history; that the college alumni would support the honor of their alma mater by voting advise a parent to send even the brightest boy to college for an academic training, while those who stepped di- if I was not quite sure that he could withstand the rectly from the school to the shop or office would advise others to seek business success by the pathway they themselves followed. This is, however, by no means invariably the case. There are university graduates-men who made good use of their time in the classrooms, and who went on to honorable places in the of to-day, too, have achieved success upon a basis of a world-who question, nevertheless, whether those four common school education; but the desirability of a formative years might not possibly have been spent to university course is becoming more and more apparstill better advantage. And on the other hand many if ent as the struggle of life sharpens. Nothing will more American independence, and the founding of our

not most of those who have gained success without a college course look back upon their early days with a regretful sense of having missed something that would have helped and benefited them all through life; of having entered the arena without a weapon which nothing can entirely replace, even though they win the battle with the arms at their command."

Mayor Strong thinks that while a college education is a good thing to have, it is far from being indispensable to the business man. He says that if he had to choose between two applicants for a position, the one a college-bred man and the other a smart young fellow with only a common school education, he should engage the first, if the post in view would warrant it, and provided the college man displayed an equal capacity for work. If the other applicant was found to be more active, more willing, he would prefer him. Mayor Strong concludes by saying :

"A college education requires the investment of a small capital and the expenditure of several years of study. The boy of natural talent, who enters business life when he leaves the public schools, begins to earn money at once; but it does not follow that the college man's time and money have been wasted. His increased broadness of vision, the greater extent of resources at his command, will equip him to contend with the exigences of life, and to grasp the business pro-

thoroughly fit a boy for the battle before him than natural talent developed by a college education, and backed up by frugal habits."

One of the most conspicuous disbelievers in the university for the training of a boy for a business life is the well known banker, Henry Clews, who is reported as saying :

"Think of a man going into business with threefourths of his brain cells filled with classical knowledge, dead languages, and high sounding but unpractical ideas!

"I have been severely criticised for saying that I would not have a college-bred man in my office. Here is my reason: To become a successful merchant, banker, or broker, one must begin young. Most college boys, when ready to enter an office, are over twenty years of age. I have a son at college-a six footer, in his twenty-first year. Can I ask him to undergo the training I deem necessary for every business man? Would he be willing to commence at the foot of the ladder, with boys of sixteen, and on a salary of \$150 per year? Why, that youth not only knows more, in every branch of knowledge, than all the office boys and clerks in this office; he knows more than his father, too.

"A collegian cannot, or perhaps will not, humble himself sufficiently to learn the rudiments of the busiblems that will confront him, with a surer hand, a ness man's vocation. He rebels against the discipline clearer head, and more ready determination than his necessarily imposed upon a subordinate. He has been brother. The latter's advance in his chosen field will be used to regard himself as a brilliant young gentleman steady, the result of unceasing labor. The college-bred for several years; can you blame him for objecting to A caricaturist in one of the comic papers has made man will gallop gracefully to the front, while the other's sit on the same bench with errand boys? And has



THE MAGNETIC BICYCLE.

Similar ground is taken by Hon. Roswell P. Flower, who says that if he had a dozen boys, he would not send all of them to college, but would carefully select from the number those he judged to be best fitted for higher education, and the rest would have to get along as best they could with elementary knowledge. He had to make his own way thus insufficiently equipped, and while he is quite contented with his fate, he cannot help wishing sometimes that in his youth he had had better opportunity for developing bis natural abilhe enough practical knowledge to deserve a place behind the desk? In my opinion the average graduate does not even know enough of arithmetic and of caligraphy to earn, upon his arrival in an office, a salary of five dollars a week. My legible hand secured for me the first good position I ever held; the average college graduate writes a fearful scrawl, and is proud of it. I understand that none of our universities employs a teacher of caligraphy. This is a sad defect, of which the collegian does not become aware, as a rule, until it is too late to remedy the evil.

"I have practically tested the problem whether a college education is desirable for a business man. Years ago I employed several college men, one after another; none of them succeeded in benefiting either my business or himself. So I got rid of them. Of the boys who came to me equipped with nothing beyond a common school education, a sound mind,

says the Safety Valve, the change in compression will gait is slow and plodding, formed in the painful school and an ambition to work, dozens are now independent business nien, while as many hold responsible positions with large firms."

A more moderate view is expressed by a member of the famous Seligman fraternity, who says that in his business he prefers men who have received a college education, but does not make employment conditional upon that fact. Although college alumni are comparatively scarce among the business men of the present generation, he believes that the next generation will abound with them, for in every walk of life the necessity of higher education is becoming more and more apparent. He thinks that while a man of sound

"I think a college education the greatest boon that race. However humble a man's station in life, knowledge At the same time a university training is not essential to success in business life. Moreover, I should hesitate to temptations sure to be offered to him there. There is too much luxury about our present-day college life. . . Very few of the business men and politicians of the older generation were college-bred; the majority of those who are leaders in the commerce and industry

of America's great intellectual leaders of the past who mind and good habits will come to the front, whether had no college education, such as Clay, Douglas, and he is college-bred or not, with equal gifts and with the same application the collegian will outstrip him in the

> The article closes with the views of Mr. Chauncey M. Depew, from which we quote:

"While the world gives on its material side such examples of success as Commodore Vanderbilt and such instances of wise statesmanship and service to his country as Abraham Lincoln, we must remember that in the affairs of life no comparisons can be made with the phenomenally gifted who are endowed by the Almighty from their birth with powers far beyond the equipment of their fellows. With the business man who must be more than his vocation, the artisan larger than his trade, and the farmer more learned than in the traditions of his fathers, it is the trained intellect disciplined by higher education which alone has any certainty of success.

"This is not a modern thought, a new-fangled idea.

nation upon constitutional lines, embodying the experience and the lessons of the ages, was the work of the graduates of the colonial colleges. Harvard, Yale, and Princeton, Columbia, and William and Mary were the architects of the Declaration of Independence, of the Constitution of the United States, of the union of the States, and of the incomparable system of executive, legislative, and judicial independence and interdependence which have survived so successfully a century of extraordinary trial and unprecedented development. Samuel Adams, in his commencement thesis at Harvard, struck the keynote of colonial resistance. John Morin Scott brought from Yale to New York the lessons which prepared that rich and prosperous colony for the sacrifices of the Rebellion. Alexander Hamilton, a student at Columbia, though only seventeen years of age, educated the popular mind to the necessity of the struggle; while the pen of Jefferson, of William and Mary, wrote that immortal document which lives and will live forever as the most complete charter of liberty.

"The best proof of the value of a college education in all the pursuits of life is to be found in the eminent success of those who have enjoyed it in the higher walks of the professions, of statesmanship, of business." -The Literary Digest.

Power Required for Electric Traction.

In an article in the Sibley Journal of Engineering, Mr. James Lyman gives the results of a number of tests made in different American cities of the power required for electric traction. At Rochester, where the first of Mr. Lyman's records were obtained, there are about 20 miles of track which was in good condition at the time of the test. The number of cars on the road was 40, each weighing about 8 tons and provided with a 15 horse power geared motor. In general the road was level, but in the heart of the town there were some gradients of from 3 to 4.7 per cent. Moving on the level the necessary tractive power averaged 38 lb. per ton of car, and for the whole run over the four principal routes at 6.5 miles per hour, the average horse power was 1.4 per car, and the maximum 6 horse power, this latter being used only momentarily. At | by going along the shores of Lake Drummond and Buffalo the same average power was required, but the

maximum was 6.6 horse power. In a large Western city a car with the axles coupled direct to the motor, without the intervention of gearing, took 0.92 horse power per ton on the average with a maximum of 4.7 horse power. In wet weather the tractive power required is reduced, the rain acting as a lubricant. Wetting of the rails round curves is particularly effective, the requisite tractive power being thereby reduced by one-third. Comparative experiments made at Ithaca, N. Y., showed that on gradients the tractive force required exceeds that on the level by more than the theoretical amount.

The Dismal Swamp and its Occupants.

"I have just returned from a visit to the Dismal Swamp," said Dr. A. K. Fisher, ornithologist of the Department of Agriculture, in Washington, the other day. "It is a strange region, full of oddities that are not to be found elsewhere. The purpose of my expedition was to investigate the fauna of the locality, and of rare mammals and birds I secured quite a number. Snakes are abundant and are alleged by the natives to be venomous, but all that I saw were harmless. When I picked up a good-sized one from a log and held him by the neck, the negro who was paddling for me shuddered so he nearly upset the boat.

"I found about fifty species of birds breeding in the swamp. One of them was Swainson's warbler, which is very rare. I trapped several species of small mice rice mice, field mice, golden mice and lemming mice. The lemming mouse is hard to catch, because it will not take any sort of bait; the only way to capture it is to set a trap in its runway. I set my traps in dry places out of water. Among other things I got two rare shrews.

"There are plenty of cattle in the swamp-small, dark and very wild. They are the progeny of animals that have strayed from domesticated herds. Hunters stalk and shoot them like deer. Bears are numerous. In the autumn they feed greedily on the fruit of the sour gum. Wildcats, opossums and raccoons are not scarce, while squirrels are remarkably abundant. The squirrels have discovered an easy way to get a living picking up the nuts and berries which have fallen into

the water and drifted in windrows. They trot along the logs and fish them out with their paws. Deer are common but hard to get. In the fall hunters run them into the lake and catch them with dogs.

"There is fine fishing in Lake Drummond, which contains plenty of perch, black bass, two kinds of pickerel, three species of sunfish and other panfish. There is no dry ground in the swamp, and one sinks at every step to his knees in mud. The cane which forms brakes all through the South is abundant. Together with a varied undergrowth, it is tangled with vines that run up into the trees, so that half a mile an hour is a good rate of progress. One must carry a knife to cut the vines, walking being further impeded by the cat brier, whose thorns catch in the clothing and hold on like hooks.

"The boats used in the Dismal Swamp are all dugouts, made from cypress logs, twelve feet long and very narrow. To shape such a craft properly is a nice piece of work. The novice who steps into one of these boats is apt to go out on the other side, but the native stands up and paddles with security. The water is darker than amber and excellent to drink; it is said to be a sure cure for malaria. There are no malarial diseases in the swamp. The swamp is full of magnolias, from the size of bushes to trees sixty feet high.

"When I was there they were full of flowers. The cypress trees are cut for shingles. The best trees for the purpose are those which fell from twenty-five to fifty years ago, and are now covered with moss. The negroes wade in and cut off the moss and rotten bark. Then they cut up the log into shingles on the spot. The next best tree is one that is newly fallen, and the third quality is the tree that has to be felled."-Philadelphia Telegraph.

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ACCORDING to Dr. Krüger, of Charlottenburg, Germany, a mixture of equal volumes of acetylene and carbonic acid gas can be used with all ordinary gas burners and gives an excellent light, and which is practically entirely without the explosive qualities possessed by the pure acetylene gas. Compressed acetylene and carbonic acid gas can be obtained commercially in Germany, so that gas illumination can be obtained independent of gas companies' pipes.

RECENTLY PATENTED INVENTIONS. Railway Appliances.

CAR FENDER.-John F. Girtler, Brooklyn, N. Y. This fender is conveniently attachable to any car, and adapted to be folded up when not in use. The fender frame is detachably connected by hooks with the dashboard, and on its lower end is pivoted a forwardly and downwardly extending platform, held in position by chains, and beneath which are track rollers, there being on the front end of the platform a tripping plate connected by springs with a guard rail, which is swung into position to hold a person in the path of the car safely on the fender, when struck by the tripping plate.

BUFFER AND DRAUGHT DEVICE FOR CARS.-George E. Shuey, Lawtey, Fla. This improvement is designed to relieve car frames from pulling shocks or strains, or the impact of one coupling on an other. A yoke is transversely secured to each coupling, at each side of which, on the car frame, are guide rods carrying springs pressed on by a follower plate, draught rods secured to the yokes passing loosely through the follower plates.

Electrical.

THERMOMETRIC CIRCUIT CLOSER.-Richard Pearson, London, England, According to this improvement, a thermometer mounted on a horizontal axis is so balanced as to be caused to oscillate under the displacement of the center of gravity by the expansion and contraction of the thermometric fluid, thus automatically completing or breaking an electric circuit for any purpose. A novel form of thermometer is employed, in which the mercury serves only to render visible the expansion and contraction of a lighter fluid, and also as a means of producing the oscillation of the instrument. the balance of which may be readily adjusted so that it will oscillate at any given temperature.

Mechanical.

pended from the axles of drive wheels, and provided arms, giving them increased speed as they near the end with reciprocating feed arms operated from one of the of their movement. The turning action is effected in a drive wheels, the mounting of the elevator enabling a gentle but positive manner, without danger of tearing person standing upon the load to readily elevate the the sheets. upper end of the elevator. At the rear of the elevator is

a rake, and shields facilitate the grasping of the hay by hook teeth at the bottom of the elevator arms, two of these teeth on each arm delivering the hay from the rake to the elevator.

Miscellaneous.

and Leander Johnson, Mead, Neb. The tire of this practically out of the way. wheel is of solid rubber, oval in cross section, fitting in a rim of similar outer surface and having side flanges, and the rim is connected to the spokes by means of bow springs, the spokes crossing each other, and each spoke being connected with the spring by a nipple or nut, by which the springs may be placed under more or less tension. By this means a maximum degree of resiliency is given to the wheel without employing a pneumatic tire, | clothes. and the wheel is made very strong.

BLASTING POWDER. - Benjamin C. Pettingell, Victoria, Canada. This is designed to be a cheap powder of great strength, which will emit no flame when exploded and will make less than half the smoke of the black powder in common use. It is manufactured by first immersing powdered carbon alone in a solution of niter, drying, and afterward adding and mechanically mixing therewith sulphur and wood pulp.

EVAPORATING LIQUIDS.-Leon F. Haubtman, New Orleans, La. An apparatus for evapois caused to absorb the moisture contained in the liquid to be concentrated by causing the hot air, driven by a the liquid flowing in an opposite direction to the movement of the air, and a current being created opposite to the current of the liquid.

Mechanical. NUMBERING MACHINE. — Thomas F. Geary and William E. Bracewell, Brooklyn, N.Y. improvement is more especially designed for use in ro-trick function in the fun improvement is more especially designed for use in ro-tary web-perfecting printing presses and other machines, projections, each adapted to support a cream drop in position to be passed into a pocket in the chocolate dipper, a perforated guide board causing the cream drops to take position upon the projections.

CLOTHES DRIER.-William M. Rowley, Cuba. N. Y. A rack of very simple and inexpensive co struction has been devised by this inventor, capable of being attached to any convenient support, and which when in use will be firmly braced, the arms adapted to support the clothes being held adjustably in a horizontal position. When the rack is not in use it may be folded BICYCLE WHEEL.-Gustave Le Blanc downward compactly parallel with its support and be

> BED CLOTHES HOLDER.-Russell T. loy, Tacoma, Washington. For holding bed clothes on a bed. this inventor has devised a holder, the gripping jaws of which will not injure the most delicate quilt or other bed covering, a locking device setting the jaws a various distances apart or substantially close together to effectually hold the thickest or the thinnest bed

> LAWN SPRINKLER.-Russell T. Joy, Tacoma, Washington. This is a sprinkler of inexpen sive construction, comprising virtually but two parts and arranged for the easy regulation of the spray. The casing has an arched bottom, which will not injure the surface of the sod, and has an inlet opening at one side to which the hose is coupled, while the separating or sprinkling cone is screwed adjustably to place, to form fine spray or to deliver the water more in sheet form.

CULINARY UTENSIL.-Edward O. Rabon, Phlladelphia, Pa. A utensil for pouring batter on rating water and saccharine solutions or other liquids has ' a griddle in making batter cakes has been provided by been devised by this inventor, in which superheated air this inventor. It comprises a vessel with an outlet at its lower part controlled by a valve actuated by a lever adjacent to the handle, whereby the device is operated by blower, to come in direct contact with a flowing liquid, a minimum movement of the hand and is made at one simple and convenient.

NAPKIN HOLDER.-Alexander A. Ver-

SCIENTIFIC AMERICAN BUILDING EDITION.

SEPTEMBER, 1895.-(No. 119.)

TABLE OF CONTENTS.

- 1. An elegant plate in colors of a residence at Edgewater, Chicago, Ill. Three perspective elevations and floor plans. Mr. J. L. Silbee, architect. A pleasing design, with many good features.
- 2. A residence in the Colonial style, recently erected in Tennis Court, Flatbush, L. I., at a cost of \$7,500 complete. Perspective elevation and floor plans, also an interior view. Messrs. Stevenson & Greene, architects, New York City. An attractive design.
- 3. A dwelling at Bronxwood Park, N. Y., recentlyerected at a cost of \$6,000 complete. Two perspective elevations and floor plans. Mr. J. M. Lawrence, architect, Mt. Vernon, N. Y.
- 4. A residence at Mt. Vernon, N. Y., recently erected at a cost of \$8,000 complete. Perspective elevation and floor plans. Mr. Walter F. Stickles, architect, Mt. Vernon, N. Y. An attractive design in the Colonial style.
- 5. A cottage at Bergen Point, N. J., recently erected at a cost of \$4,200. Mr. Wesley J. Havell, architect, New York City. Perspective elevation and floor plans. A neat design, showing some original and pleasing features.
- 6. A dwelling at Bedford Park, New York City. Two perspective elevations and floor plans. Mr. Edgar K. Bourne, architect, New York City. An attractive design in the English Gothic style.
- 7. A two-family dwelling recently erected at New Haven, Conn. Two perspective elevations and floor plans. Cost complete, \$5,080. Architects, Messrs. Stillson & Brown, New Haven, Conn.
- 8. St. Ann's Episcopal Church, Kennebunkport, Me. Perspective view and ground plans, also an interior view. Mr. H. P. Clark, architect, Boston.
- 9. A residence at Williamsport, Pa., recently erected for J. F. Fredericks. Architect, David K. Dean. Perspective elevation and floor plans. An attractive

to be inserted in the type or printing plate cylinder. to effect numbering with each impression. The numbering wheels, meshing with gear wheels, are mounted in a frame to be set in the plate, the shafts of the wheels passing through a slot in a spring-pressed slide carrying

ENGRAVING MACHINE.—Jere G. Kingsburv. Bridgeport, Conn. This is a machine for cutting numbers in intaglio, or below the surface, upon a counting wheel, the wheel doing all the work of cutting and finishing with the service of but a single attendant. It has two shafts, one supporting a master wheel and the other a blank wheel, there being means for imparting rotary movement to one shaft and a compensating gearing between the two shafts, while a delineating arm having a tracing point engages the master wheel and a cutting tool engages the blank wheel.

Agricultural.

HAY LOADER.-Ole and William Swenson, Cresco, Iowa. In this implement an elevator is sus-

AFFIXING STAMPS .- William L. Dinsa pawl engaging one of the gear wheels, while a head is moor, Portland, Oregon. This inventor has devised a engaged by the impression cylinder to operate the slide. machine, to be operated by one hand, for applying stamps to envelopes and other packages to be mailed, the machine holding a large number of stamps, which are fed out one by one, moistened and applied. The machine has a spring-controlled plunger, beneath which is a sliding table, a stamp-feeding device being operated simultaneously with the upward movement of the plunger, while a moistening device independent of the plunger is operated from the table. It is said that the machine will stamp 45 letters per minute, and it may also be used for moistening envelopes.

> MUSIC LEAF TURNER. -- Daniel T. Fox, Mount Pleasant, Pa. The body of this device supports a series of pivoted swinging sheet-carrying arms, fingeroperated throw devices being arranged when pressed upon to throw the carrying arms. The throw devices include lever members to impart a speed movement to the

lower ends a doubled up clamping band to securely hold the napkin in position.

DESIGN FOR FAN RACK.-Alexander H. Davison, Athens, Ga. This device comprises a vertical column or post with circular base, there being on the post star-like figures with serrated or toothed edges.

Note.-Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

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design.

- 10. A Colonial house at Far Rockaway, N. Y. Architects, Messrs. Child & De Goll. Perspective elevation and floor plans. A model design. 11. Miscellaneous contents : The Hayes metallic lathing,
 - illustrated .- Neolith as a paint and decorative medium for relief work, illustrated.-Gas radiators, fire grates, etc., illustrated.-Improved heaters, illustrated.-Improved sash lock, illustrated.-American homes and the cabinet or parlor organ, illustrated.-The Laurie steel lath, illustrated. -The Austin & Eddy sash hanging attachment, illustrated

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