A Sectional Steamboat.

Everybody knows the ingenuity with which the French make preparations for new requirements in their military expeditions, an ingenuity which resembles closely that which the Americans display in their engineering operations for civil purposes. At present the only military enterprise occupying French attention is the establishment of its influence in Madagascar, and Le Genie Civil describes some curious devices which have been invented for the invasion of that country. The capital of Madagascar, Tananarivo, is situated among the mountains of the interior, and is inaccessible, except by footpaths, the government having always prohibited the construction of roads by which artillery could be brought against the city. French armies are, however, not deterred by such trifling difficulties, and a campaign against Tananarivo has been carefully planned. As there are no roads, a river, the Ikonpa, which extends from the sea to the foot of the mountains, just below Tananarivo, is to be used as a road. This river is very shallow and obstructed by sand bars, and the problem is to construct vessels capable of navigating it. This problem has been solved, so far as the gunboats are concerned, by building eight compound boats, or rather rafts. Each of these boats is divided longitudinally into six compartments, each compartment being watertight and independent, so that it can float alone, while, in case of need, any number of them can be bolted together, side by side. These separate compartments, or shells, are of galvanized steel and very light, so that they can be easily transported overland, thrown into the water, and bolted together as they float. When in place, a deck is put over them, on which is placed, near the front, a small boiler of the locomotive type. To balance the weight of this, the engine is set near the rear end of the deck, and is connected directly to a light stern wheel, which serves for propulsion. An upper deck, on which are the pilot house, shields of steel plates for riflemen, and a light cannon, covers the whole extent of the lower deck. All the vulnerable parts of the craft are protected from musketry by steel shields. The whole affair, with stores, crew, and armament, draws less than fifteen inches of water. To provide for passing sand bars, a powerful turbine pump is placed at the very front of the vessel, with a suction pipe which can be lowered as required to any distance less than one meter from the surface of the water. On reaching a sand bar this suction pipe is run out, and the turbine set at work. The sand, mixed with water, is sucked out with great rapidity from in front of the craft and thrown, by a discharge pipe, to one side, and a passage through the bar is in this way soon made.—American Architect.

A LIGHTNING PHOTOGRAPH.

To the Editor of the SCIENTIFIC AMERICAN:

I send you a photograph of lightning, which I made about 11 o'clock on the night of May 5, during one of the most remarkable electric storms ever witnessed in this section of the country. There were three distinct bolts of lightning at the same instant. One of them, after seeming to coil itself around one of the others, darted off to an electric light tower, which stands 150 feet high near the northeast corner of the square occupied by the buildings of the Institution for the Blind, located in this city, and seen in the foreground of the picture.

I send this because I think it will be of interest to you and your readers.

GEO. F. TOWNSEND.

Austin, Tex., May 13, 1895.

American Diggers in Greece.

A gymnasium and other well paved buildings have been uncovered at Eretria, as well as three inscriptions, three heads, and some good architectural fragments. The excavation of the theater has been nearly completed.

The excavations among the ancient Greek ruins at Eretria have been carried on some years by the American School of Classical Studies at Athens. The gymnasium and other buildings which have been uncovered are probably part of the buildings on each side of the ancient street laid bare last year between the theater and the naval school of King Otho.

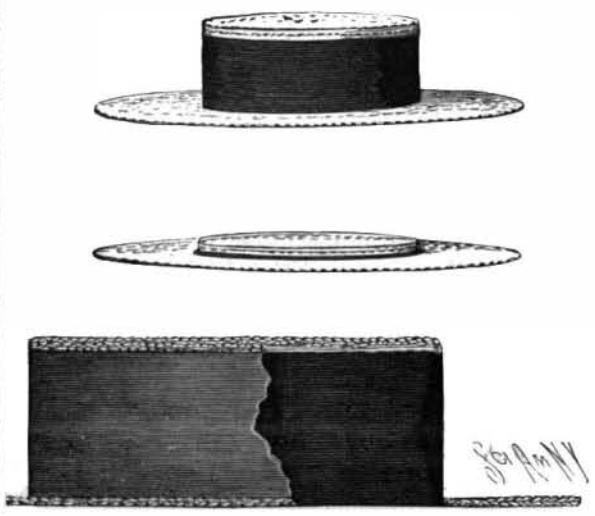
When the houses found last year were cleared a floor of cement and pebbles was discovered about a yard below the surface. The well-paved buildings mentioned by Mr. Peabody are doubtless of a similar construction.

Sales of Patents.

There are a number of concerns that purport to sell patents on commission, but in all cases, so far as we can learn, they induce patentees to pay them money in advance, on which the pretended sellers live, the patents never being sold. The trick is a barefaced swindle. If any of our readers have knowledge of such payments, we should be glad if they would send us the particulars; not for publication, but for private use in establishing the fact of such payments, with view to a remedy.

A STRAW CRUSH HAT.

The high hat of the crush variety is old, but the brilliant genius who surpassed the inventor of the starched necktie in contributing the opera hat to the world of male fashion stopped short at silk and did not venture to produce a crush Leghorn. Such we now illustrate—a Parisian production—uncompromising and hard in appearance as Captain Cuttle's tarpaulin,

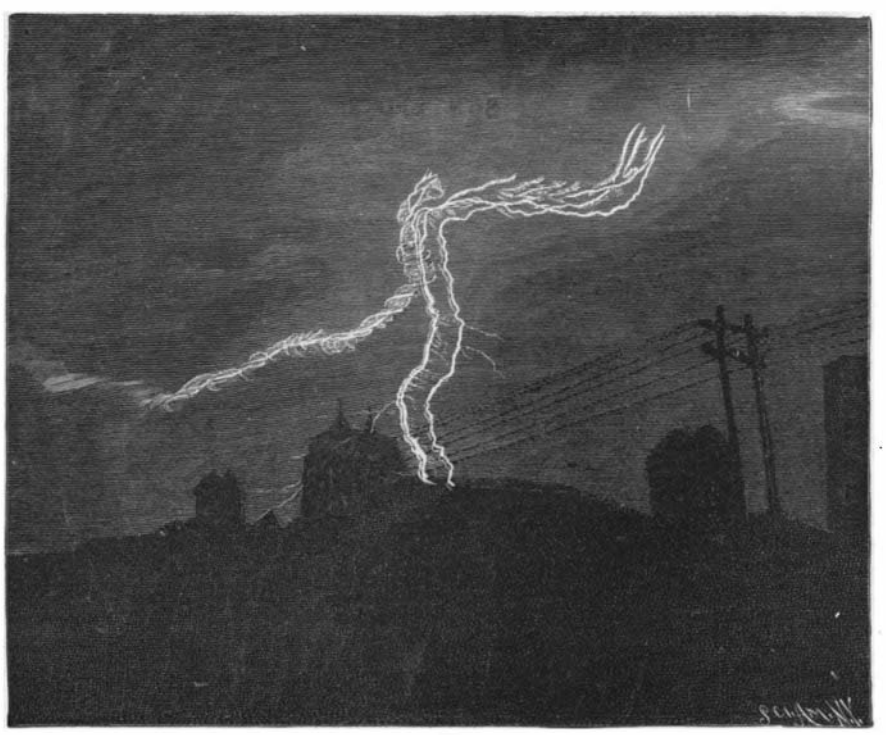


A STRAW CRUSH HAT.

but which, placed beneath the arm, succumbs to pressure; which left carelessly in a chair may receive the avoirdupois of a careless sitter without injury to its anatomy. Like other things in the realm of fashion, it is a deception. The upper crown is straw and the brim is straw; the sides, ordinarily covered with the band, are wanting; the band is there, but there is no substratum of straw. Instead, there is a steel spiral spring, which forces up the crown and stretches the wide band or ribband tightly. The cut, with this description, explains the artifice. When pressed the spring yields and crown and brim come into the one plane. Released from pressure, the sides are forced out to their proper cylindrical contour as the crown rises.

A Cure for Colds.

We are often told that while we may be able to cure consumption or pneumonia, yet we cannot cure a common cold. We desire to state in this connection what we have often said before, that we have a very favorite remedy for all these cases. We have tried it in very many instances and with almost invariable success. The remedy to which we refer is phenacetine. So soon as the patient feels the premonitory symptoms of the cold let him take a hot footbath at bedtime, drink freely of some warm drinks, and take five, seven and a half, or even ten grains of phenacetine. In a strong adult we do not hesitate to give the full dose of ten grains. The result is that the patient has a good night's sleep and awakens in the morning free from pain, while nearly all the symptoms of the cold have disappeared. Of course unusual care must be exercised during the day to prevent the body from becoming chilled.—Medical Compend.



A REMARKABLE LIGHTNING STROKE.

Lessons of the China-Japanese War.

An article in the Marine Rundschau upon the changes in warship building indicated as necessary by the events of the China-Japanese war, and especially of the battle of the Yalu, is most interesting. The writer has collated the various accounts of the events, and has had special information before him, and the table he gives of the damage inflicted upon the ships engaged, and more particularly upon those of the Chinese, illustrates the matter in full detail. A second table sums up the results of the detailed inquiry, and a third describes sundry improvements, mostly of a temporary kind, introduced by the Chinese themselves, such as covering in the barbettes of the Ting-Yuen and Chen-Yuen with light plating as protection against rifle fire, and to shut out the smoke. The conclusions of this writer are that armor protection is more than ever necessary; including gun emplacements, fighting stations, auxiliary engines and also water torpedo rooms. He advocates a complete armor belt, with numerous watertight compartments, and the making an absolute certainty that these last shall be closed as well as all other openings through which water may come in. Finally, he questions the value of fighting masts. Philo McGiffin, a graduate of our Naval Academy, who commanded the Chinese armor-clad at the battle of Yalu River, and who has returned to the United States, is reported as saying that the battle was a stubborn one, and was lost to the Chinese chiefly because they had no shells to use, but only solid shot. The Japanese, he said, were well supplied with shell, which did great execution.

Captain McGiffin, in a recent letter on his experiences with the Chinese navy, writes: "A layman has no conception of the awful nature of battle in modern naval vessels. Even the cruisers have steel sides, and the air of the inclosed spaces is very confined. The din made by the impact of heavy projectiles against these metal sides is awful beyond description. I wore cotton in my ears, but, in spite of that, am still deaf from that cause. The engineers in the Chen-Yuen stuck to their work, even when the temperature of the engine rooms was above 200° F. The skin of their hands and arms was actually roasted off, and every man was blinded for life, the sight being actually seared out. Late in the action, after my hair had been burned off and my eyes so impaired by injected blood that I could only see out of one of them, and then only by lifting the lid with my fingers, I was desirous of seeing how the enemy was delivering his fire. As I groped my way around the protected deck, a hundred pound shell pierced the armor about eighteen inches in front of my hand. In a second, my hand touching the steel was so burnt that part of the skin was left upon the armor. That shows how intense is the heat engendered by the impact of a shot, and how rapidly the steel conducts that heat. One shell struck an open gun shield of the Chen Yuen early in the action, and, glancing thence, passed through the open port. Seven gunners were killed and fifteen wounded by that shot. Early in the fight the Maxim gun in our foretop was silenced. The holes pierced by a shell could be seen from the deck. After the fight we found the officer and men on duty there all dead and frightfully mangled. That one shell had wrought the havoc. The detonations of the heavy cannon and the impact of hostile projectiles produce concussions that actually rend the clothing off. The Chinese sailors deserve all credit for their courage and obedience in that action. No duty was too difficult or dangerous. When the Chen Yuen's forecastle was ablaze from Jap shells, I ordered several officers to cross the shell-swept place to fight the fire. They shirked that duty, but when I called upon the men to volunteer to follow me, they did it promptly, and the ship was saved. It was while on this duty that a shell, passing between my legs, threw me aloft and let me down upon the deck with such violence that I became unconscious, and was out of the fight. All of the officers, however, were not cowards. On my ship were several who had been educated in this country, and they were as brave and devoted as men could be. Others, however, were in the safest place they could find amidships."

A Soap for Cleaning Silk.

A soap for this purpose is made by heating 1 pound cocoanut oil to 96° F., adding ½ pound caustic soda, and mixing thoroughly. Then heat ½ pound white Venetian turpentine, add to the soap, and again mix thoroughly. The mixture is covered and left for four hours, then heated again, and 1 pound of ox gall is added to it and well stirred. Next, pulverize some perfectly dry, good curd soap and add it to the gall soap in sufficient quantity to make it solid—1 or 2 pounds of curd soap will be needed. When cold, the mass should be pressed into cakes.

Economy to the Consumer of the Incandescent Gas Burner.

BY PRESIDENT HENRY MORTON, PH.D.

During the meeting of the Western Gas Association held in Pittsburg May 15, 16, and 17, a paper was read on the subject of incandescent gas lighting, which, with the discussion following it, conveyed much of a comforting as well as interesting character to the general reader or rather general gas consumer.

The author of the paper in the first place had many things to say in disparagement of the Welsbach incandescent gas burner, from his standpoint as a gas manufacturer, on the ground of its reducing the output and profit of the gas company under his charge, by affording those who used it an increased amount of light at about half the cost of the ordinary burner.

In the course of the discussion which followed, the same gentleman gave some illustrations, as for example: "We have a club room in our city which used 81,400 cubic feet of gas from January 1 to May 1, 1894. On January 1, 1895, we replaced the burner commonly used there with Welsbach burners, and from that time to May 1, 1895, they used 35,400 feet—a loss to us of 46,000 feet, or over 50 per cent on one customer in six months."

From the point of view of this manager of a gas works, this was truly disheartening; but how about the club in question or consumers generally? To these we think the statement will convey nothing but pleasure, qualified by the consideration that it is almost "too good to be true."

If any such statement came from the Welsbach Company or any one interested therein, it would carry little weight, but coming from one who is manifestly an enemy and in deadly earnest, it is equally convincing and encouraging to the gas-consuming public.

It may however be asked, Is this benefit to the public to be secured only at the expense and perhaps by the ruin of the gas companies? For, if this is so, it may in the long run be of doubtful advantage even to consumers.

To this question an abundant answer was given in the discussion which followed the paper on incandescent gas lighting.

In this discussion a large number of the managers of gas works present took part, and without exception each one in turn, while indorsing the statements of the paper as to the advantage to the consumer, emphatically denied the deduction as to injury to the business of the gas companies under their charge.

They all showed, from their own experience, that while the introduction of the Welsbach burner had often in the first instance and for a short time diminished the total amount of gas used, this influence was promptly reversed by reason of the additional customers secured and light used, through replacement of oil lamps by the economical and brilliant Welsbach, and its displacement of electric lamps both arc and incandescent. Indeed, the only note of distress heard in this connection was one intimating regret that the business of supplying Welsbach burners was not in all cases in the hands of the gas companies.

A full account of this paper and discussion was published in the American Gas Light Journal for May 27, and is interesting reading to the gas consumer who has an eye to economy.

It is not often that any one can point to the fulfillment of a quasi-prediction, and it is, therefore, with pleasure that I find in the report of a paper which I read before the Society of Gas Lighting on January 17, 1889, the following words:

"The mere cheapening of gas I contend is not the only or the scientific method of correcting the manifest wastefulness of our present methods of using it to produce light. It would be like saying that to secure cheap fuel was the right way to improve the steam engine. In the case of gas, such a policy, if persisted in, can only result in relegating gas to the cellar, the kitchen, and the engine room, to warm us, to cook our food, and to drive our machinery; and in replacing it as a means of illumination by electricity, which may, in time, owe its very existence and life to the enslaved labors of its deposed rival imprisoned in the furnace of the steam engine or laboring blindly in the cylinder of the gas engine.

"I believe that gas, much as it has been abused, deserves a better fate, and will secure it if anything like the attention is given to its education and refinement, as an illuminating agent, which has been lavished upon its impalpable rival, electricity.

"I believe that a good beginning at least has been made in this direction by Dr. Auer von Welsbach and those who have been developing and improving his very original invention; and it, therefore, gives me pleasure to bring before you this evening (among other recent developments in artificial illumination) a number of the burners known by the name of Welsbach, in the latest form to which the process of gradual improvement has brought them, and to point out to you what I have found in my own experience as to their actual merits or probable future advances."

As illustrating the present attitude of the gas companies toward the Welsbach light, it may be noted that, at the conclusion of the discussion above referred to, a vote of thanks was passed to Herr Auer von Welsbach for his discovery and production of the gas burner bearing his name.

Electric Canal Towage.

Canal barges have recently been very successfully towed by electric power on the summit level of the Canal de Bourgogne. This portion of the canal is 3¾ miles long and has been made very narrow to reduce construction expenses. There is no tow path, and hauling is effected on the submerged chain principle. The hauling upon the chain is now done by electric power instead of by steam, as heretofore. A generating house has been fixed at each end of the section, the current being generated by water power. The dynamos at the two stations, 3¾ miles apart, are coupled in series. The three mains are suspended on rubber insulators in part from wires spanning the canal and in part from the tunnel roof of the tunnel sections of the canal. Trolley arms of the usual type are used. The motor used on the tug which hauls upon the submerged chain is of 19 horse power, running at 900 revolutions per minute. During the passage through the tunnel the current is utilized to light the boat, and at night is used for this purpose during the entire run. The cost of the plant was about $27,000, and a saving of $800 a year is recorded.

RECENTLY PATENTED INVENTIONS.

Engineering.

COAL DUST AND AIR FIRING.—Constanz Schmitz, Berlin, Germany. This invention provides a method of and apparatus for mixing coal dust and air in proper proportions for feeding to a furnace to obtain perfect combustion, the coal dust being fed into a chamber where air is in motion, and where the impurities may be separated from it, while by means of a blowing engine the mixed coal dust and air, through a connection with a feed device, are fed to the fire, the velocity of the air maintaining in suspension just the quantity of coal dust which can be burned in the most advantageous manner under the conditions presented.

VESSEL STEERING APPARATUS.—Sebastien Lacavalerie, Caracas, Venezuela. This is an apparatus especially adapted for use in connection with a vessel of conical shape, adapted to go below the surface of the water, forming the subject of another patent issued to the same inventor. It is designed to facilitate steering the vessel either up or down, or to one side or the other, or to cause it to progress in a sinuous line. The apparatus comprises a box projected beyond the vessel and capable of revolving in its seat, a shaft carrying a rudder being mounted in the box and capable of turning with it, while the box and shaft are operated by mechanism within the vessel. Rudders are mounted on the sides of the vessel and operatively connected with each other, there being also a bottom rudder and an end rudder rotating about vertical axes.

Railway Appliances.

BRAKE SHOE.—James E. Worswick, Americus, Ga. This is an improvement on a former patented invention of the same inventor, and provides a combined brake shoe and dresser, the body of the shoe of soft metal, with transverse cutting faces of harder material extending flush with the outer face of the shoe, the shoe being of greater width than the tread of the wheel, and the outer edge of the cutting faces overlapping the rim of the wheel. The improvement is designed to keep in true shape the entire wearing face of the wheel, from the throat of the flange to the outer edge of the rim.

SWITCH ADJUSTER.—John Kortan, Jr., Detroit, Mich. This is a simple and inexpensive device for use on all kinds of street railways, for adjusting the swinging tongues of frogs without requiring the operator to leave the car. It comprises a vertically movable rod at the lower end of which is a blade having curved fingers extending on each side, and the rod having a handle with the same set as the blade.

RAILWAY SWITCH.—Louis V. Johnson, Brooklyn, N. Y. This switch is to be worked by contact of the wheels with a shifting device on the rails, but which may be passed over without working the switch if desired, the car automatically opening the switch if desired, and closing it after the car has passed. Combined with the switch point is a horizontally sliding shifting plate with a flange at each end, the flanges projecting above the tops of the rails for contact with the car wheels, and there being intermediate mechanism between the plate and switch point for operating the latter from the plate.

CAR FENDER.—Rafael Mayolini, New York City. This is a bow fender, readily transferable from one end of the car to the other, and made in two spring sections, which, when curved, brought together and locked, are designed to completely guard the front of the car, the front and sides of the fender being cushioned to prevent injury to any one caught upon it. The connected fender sections may be quickly disconnected from the car platform, when the spring frames throw the sections outward, carrying with them to the sides of the track any interfering objects.

CAR FENDER.—Edward L. Kelly, Philadelphia, Pa. This fender consists of a wheel mounted on a vertical spindle carried by a bracket at the front edge of the car platform, the wheel extending horizontally entirely over and beyond the track rails on each side, and having an effective gripping surface at its periphery, to make a good hand hold for a person falling upon it. The wheel may be rotated in either direction to carry one to the side of the track, and the front edge of the platform above the wheel is covered by a buffer, with side cushions, to prevent injury to one falling upon the wheel.

Mining.

MINING MACHINE.—Frank S. Dobson, Vancouver, Canada. For raising gold from rivers, bars or flats, this inventor provides a vertically movable caisson in which is a central pump and agitator, with appliances whereby the water from the stream may be made to force the material to the pump and assist the agitator in removing it, or the water may be introduced to the pump and the agitator under pressure from the support of the caisson. All the interior parts of the caisson may be removed, leaving a clear shaft within which a miner may descend to prospect or run a drift or tunnel

Mechanical.

STONE CUTTING MACHINE.—John G. Kouhoupt, Jersey City, N. J. According to this invention a frame carries a stationary anvil provided with converging slideways in which knives are removably fitted, while a reciprocating die in the anvil-carrying frame has cutting edges registering with the knives of the anvil. This machine is very simple, and may be constructed as an attachment to an ordinary trip hammer. It is designed for rapidly splitting and cutting stones, and is especially adapted for forming cobble stones or other small stone blocks.

COATING AND PRINTING PAPER.—James E. Gledhill, New York City. Two machines are arranged side by side for this work, according to this invention, one receiving the paper from the other, two rolls arranged at right angles to each other being arranged in the path of travel of the paper between the two machines, the paper passing first under one roll and over it in a transverse direction, and under the second roll and over its top, to pass in a parallel direction to the second machine.

DRIVE WHEEL FOR ELEVATORS, CARRIERS, ETC.—George S. Fouts, San Jose, Cal. According to this improvement the pulley supports movably connected clamping sections which may move into and out of binding contact with the cable, to permit the cable to move freely between the sections as it moves into contact with the wheel, and then to cause the sections to press upon the cable during a portion of the revolution of the wheel, thus driving the cable without any slipping. The device adjusts itself to carrier flights or other projecting portions on the cable, or to sticks or other obstructions between them and the band clamping sections.

Agricultural.

PNEUMATIC STACKER.—Thomas Kirshman, California, Mo. For effectively carrying the straw, chaff, etc., from the discharge end of a thrashing machine to any desired place, this invention provides for a vertical fan to be secured to the rear end of the machine over the discharge opening, the opening becoming the eye of the fan, into which the straw and chaff are discharged, to be driven from the fan into and through an appropriate discharging trunk or chute. The discharging pipe has an elbow mounted to turn and loose sections connected by links, and may be raised and lowered without disconnecting the sections.

INCUBATOR.—Norman McAslan, Briggs, Neb. The case of this incubator has a series of egg compartments in which the egg trays are so arranged that the eggs may be subjected to different degrees of heat, according to the length of time which the eggs have been in the incubator. An improved method of ventilation is provided, and the heating apparatus is so arranged that the temperature may be controlled to a nicety, the heat being regulated by a thermostatic device.

Miscellaneous.

BICYCLE DRIVING GEAR.—Thomas M. Crepar and Hugh Hunter, Clare, Mich. The pedals are arranged to move up and down in the segment of a circle, according to this improvement, instead of the rider being compelled to follow the pedals with the feet in a circle, a simple transmitting mechanism actuated by the pedal levers imparting a rotary motion to a driving sprocket wheel of the ordinary kind. The simple up and down movement of the feet, with the use of a large sprocket wheel, is designed to facilitate the attainment of great speed with the least effort.

BICYCLE HABIT.—Herbert Luey, Brooklyn, N. Y. This improvement comprises a skirt divided at the back and made with folds at the rear which are combined with interior partitions forming leg portions. When the garment is in use the limbs are free to work the pedals, the folds falling on each side of the saddle, and when the rider steps from the machine the rear folds close into the appearance of an ordinary skirt, no difference from which can be detected either at the front or rear.

UMBRELLA FRAME.—Daniel H. Redmond and Chalkley B. Baldwin, Philadelphia, Pa. This invention provides an extremely simple method of forming the joints connecting the umbrella ribs with the stretchers or braces by the employment of a light and efficient clip, whereby the rib is strengthened in what has heretofore been its weakest point, and may be made very light.

FOLDING UMBRELLA.—Frank G. Grove and Don P. Lillard, Luray, Va. This is an improvement upon a former patented invention, providing an extensible brace which is easily operated, cheap and very strong. The stick is made up in sections screwed together, and each brace comprises a hollow inner section and an outer section, the sections sliding upon each other. When the umbrella is spread the braces slide out until the springs catch and lock the cover in extended position, and in folding the stick is reduced to compact shape, the tip removed, the braces collapsed and the cover folded in.

FENCE WIRE STRETCHER.—John O. Walton, Belle Vernon, Ohio. To draw and tighten fence wire without making short bends which might injure the wire, this inventor has devised a simple device which may be readily attached to a fence for this purpose without cutting the wire or taking it down from its fastenings. The device has a central cast iron hub-like portion from which project wings with narrow throat-like ways, so arranged that by turning the hub in either direction by means of a wrench, in using the improvement, the throat ways pass over the wire strand and wind it about the hub until the desired tension is attained.

SWIVEL COUPLING FOR VEHICLES.—Brown Henley, Hillsville, Pa. This is an improvement designed for employment in the front axles of carriages and wagons, the lower member of the coupling having opposite recesses in the outer side of its exterior circular flange, and the upper member having opposite notches in the edge of its outer flange to engage the lower member. The clips employed have claws fitting the notches and entering the recesses, the latter being elongated to allow of some lateral movement of the claws. The clips serve as stops, limiting the degree to which the axle may turn, and also secure the axle to the spring, preventing lateral movement of the latter without weakening it.

COMBINATION TABLE.—Francis J. Merceret, Baltimore, Md. A table adapted to inclose and hide a gas stove, or form a base for it in use, has been patented by this inventor. It has a hollow body with a longitudinal partition, and across the partition are guideways on which is an adjustable sliding dish shelf, the top being made in two parts, hinged at about the middle. Besides its use as a kitchen table when opened, it may serve as a library or sitting room table when closed up, being especially designed for use in light housekeeping in flats or apartments.

MATTRESS.—Morris Rude, New York City. This mattress presents special conveniences for handling while turning or airing, and is arranged to be bound loose or tight, as may be desired. It has a string alternately engaging part of the top and part of the bottom, the drawing upon the string compressing the mattress at opposite faces. The string is drawn through different sets of eyelets, and thus forms several transverse series of loops on the top and bottom faces of the mattress.

COPYING BOOK BRUSH CUP.—George J. Wohltman, New York City. This is a narrow, pan-like vessel with a cover across one end and a grating extending nearly its whole length just over the water. The grating is removable to facilitate cleaning, and the brush, when not in use, is ordinarily laid flat on the grating.

HOT WATER FURNACE.—Edwin F. White, Hollidaysburg, Pa. A horizontal partition forms the top of the fire box of this furnace, and there is a chamber under the grate at its front end and connected with the water return pipes, pipes leading from the chamber extending under the bars of the grate to the rear of the bridge wall and then upwardly, each pipe then forming a horizontal coil under the partition, over which is a second coil discharging into a chamber connected with the outflow pipes. The construction is designed to afford quick circulation and utilize the fuel to the fullest advantage.

HEEL.—William Wass, Philadelphia, Pa. This invention relates to the employment of detachable wear plates upon boot and shoe heels, and provides an attaching plate fastened to the heel proper and a wear plate held in locking engagement with, but removable from, the attaching plate. The wear plates are inter-