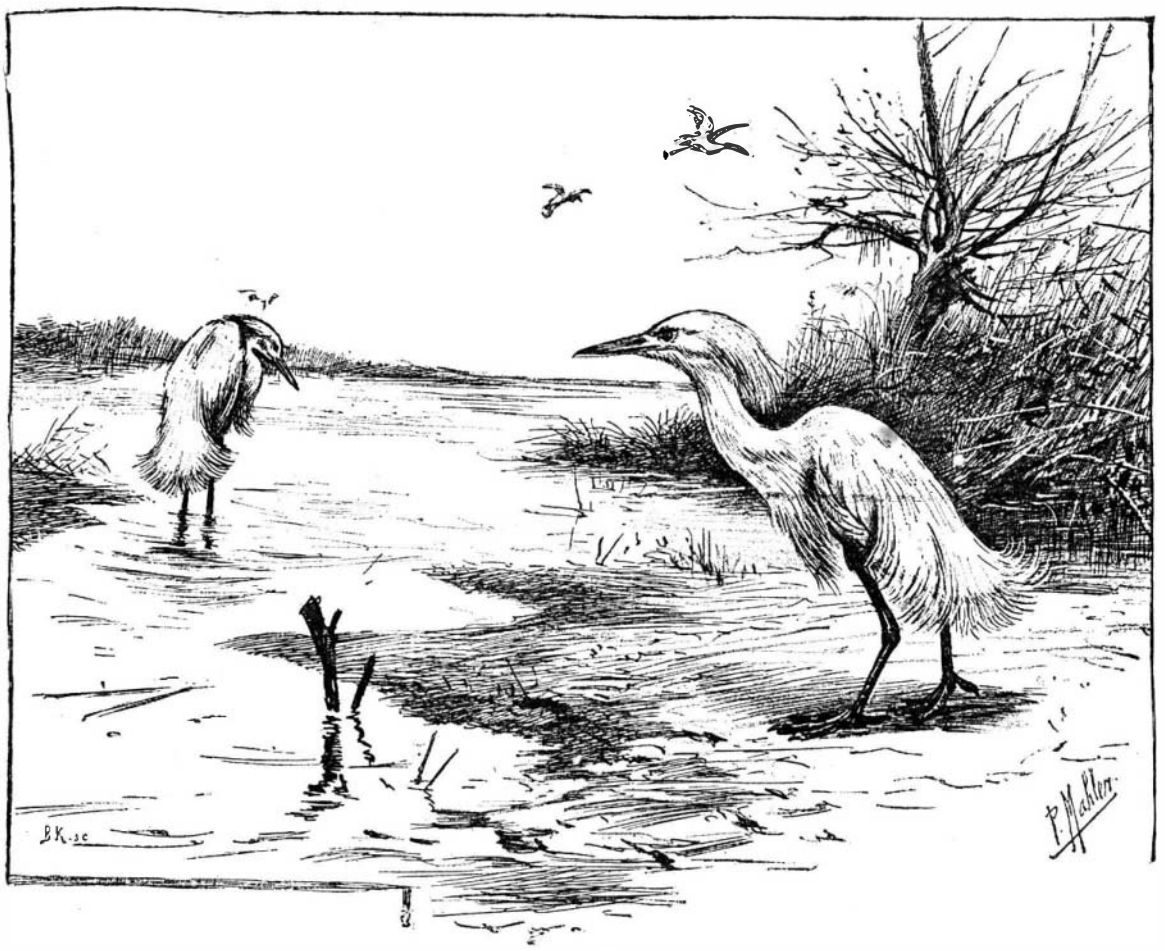
THE HERON.

The neron is a wading bird of the family Ardeidae and the old genus Ardea (Linn.), including also the bitterns and egrets. The food of the heron consists largely of fish and reptiles, but it will eat small mammalia such as mice and even water rats. There was found in the stomach of one of these birds seven small trout, a mouse and a thrush. Eels are also a favorite food with the heron, but on account of their long, lithe bodies they are usually taken to shore and killed by pounding on the rocks or the ground. The heron is able to disgorge its food, and when pursued by birds of prey often resorts to this measure. When looking for food the heron usually stands in shallow water, where it remains immovable for a long time, but when it sees a fish or other kind of food it strikes it with its sharp bill. When attacked the heron instinctively aims at the eye of its adversary. Even a game cock has difficulty in protecting itself from the heron. The beak of this bird is sometimes set on the end of a stick and used as a spear. The body is rather compressed; the neck is very long and is well feathered. The wings and legs are long. The serrated middle claw is for removing from the bill the sticky down which is apt to adhere to it after cleaning the plumage. The nest is almost always built upon some elevated spot, as the top of a large tree or on rocks near the coast. It is a large and clumsy looking nest made of sticks and lined with wool. The nests are clustered near together for mutual protection. The eggs are from four to five in number and are of a pale green. The heron itself is gray running into black and the plume is dark slaty blue. The total length of the bird is about three feet.

The heron is widely distributed. The Louisiana heron is called by Audubon the "Lady of the Waters." The American varieties of the heron are sometimes seen as far north as Massachusetts. The heron was once one of the commonest English birds, but on account of the drainage of the swamps it is now seldom seen except in localities where the conditions are such that the birds can flourish. For our engravgraving we are indebted to Le Naturaliste.



THE HERON.

Railway Enterprise in Egypt.

Consul Penfield, United States consul at Cairo, in a report to the State Department, remarks as follows: It is said that Egypt, in proportion to population, has more railway mileage and better service than Austria-Hungary, Spain or Portugal. All railways are government property, with the exception of a short suburban road from Alexandria along the Mediterranean to Ramleh, a 15 mile line connecting Cairo with the health resort of Helouan, and a steam tramway on the bank of the Suez Canal, joining Port Said with Ismailia. These private enterprises, as well as the government lines, are very profitable. The income of the latter is pledged to certain European creditors of the country, as a partial consequence of the extravagance of Khedive Ismail.

A network of rails spreads over most of the delta, and the main line has for two or three years extended southward in the Nile valley to Girgeh, 336 miles from Cairo. Two years hence, the road will be completed to Keneh, 66 miles further south; and contracts have just been signed for carrying it to Assouan, the frontier town of Egypt, at the first cataract of the Nile, and 710 miles from the Mediterranean. This terminus is expected to be reached in time for the Upper Nile tourist traffic of 1897-98.

The moderate speed at which all trains are driven, save the expresses, and the cheapness of native labor permit the working expenses to be kept much below the European average. A level country, with frosts and violent storms unknown, makes railway construction a simple matter. Rock blasting, tunneling, excavating, and trestle building are practically unnecessary.

GEN. MILES strongly advocates extending the use of the bicycle in the army. The Signal Corps is now making a good deal of the specialty of wheeling, and its use in this branch of the service is to be still further developed.

The Ether.

The old and fascinating problem concerning the manner in which the ether moves with or through matter has been attacked, says Nature, by Herr L. Zehnder, who contributes an interesting paper on the subject to Wiedemann's Annalen. He endeavored to decide whether the ether is pushed along by atoms or bodies, or whether it passes through them without resistance, or, finally, whether only a portion of the ether adheres to the particles of bodies, and this portion only is carried along. The apparatus used consisted of a cast iron cylinder in which a piston moved airtight. A narrow tube led out from one end of the cylinder, doubled back upon itself, and returned by the other end. Now, if the cylinder was exhausted of air, and the piston pushed the ether before it, the latter would stream through the narrow tube with a velocity greater than that of the piston in the ratio of the sectional areas of the cylinder and the tube. This ratio was 560, and exhaustion was carried to 1·40,000 of an atmosphere.

To test the motion of the ether, a beam from a brilliant sodium flame was passed through two thick parallel glass plates, the second one being silvered at the back. This plate, by its two reflecting surfaces, split the beam into two, each of which traveled through one portion of the narrow tube. The two beams, reflected near the cylinder by a rectangular prism, were recombined by the same thick plate and returned along the way they had traveled, being finally reflected into the reading telescope by the first plate. Interference fringes were thus produced in the field of view, the motion of which would have indicated a motion of the ether. But no such motion was observed when the tubes were thoroughly exhausted, so that it must be concluded that the ether passes freely through solid bodies. The corollary to this conclusion, that there is a relative motion between the earth and the luminiferous ether, though investigated by the author by means of a new and ingenious apparatus on the Rosskopf, near Freiburg, could not be proved.

The Theory of a Draw Cut.

A writer in the Railway Review thus explains why it is that a knife cuts better when drawn across the object to be cut:

"This matter of varying the angle of cut by varying the motion of the cutting tool is something that is learned almost instinctively in actual practice. The small boy very quickly comes to understand that his knife will cut better if he gives the blade a drawing motion while cutting. This is due to two reasons: One that the knife, even on the rare occasions when it is sharp, is microscopically a saw, and the drawing motion gives the teeth a chance to act; and the other that, as the drawing becomes more rapid, the cutting angle of the blade is made smaller and sharper, so that a rapid draw really gives a temporary sharpness to the instrument. These are trifling and elementary matters, but they will serve to emphasize what I have many a time urged upon young mechanics: the desirability, nay, the very necessity, of close observation of and speculation upon the reasons for the common phenomena of everyday life."

Coloring Photographs.

Hector Kraus thus describes a process recently patented in Germany. The pictures are colored from the back. The coloring permits the finest details, in regard to light and shade, while the brilliancy of the colors and the effects produced perfectly harmonize with the general tone of the photograph itself. The colors employed for this purpose are aniline colors, which are dissolved in water or alcohol, and the solution, which can be made either warm or cold, must be as concentrated as possible. Numerous experiments have shown that certain aniline colors, dissolved in water or pure alcohol, give the desired results, while other colors require a solution, in a mixture of alcohol and acetic acid, in order to be utilized for this purpose. The number of aniline colors which can be produced in this manner is, of course, unlimited. Those colors dissolved in alcohol, or in a mixture of alcohol and acetic acid, must be kept in well stoppered bottles, so that they keep as long as possible the capacity of penetrating into the paper or other material. In order to use the prepared colors, they must be diluted with a medium, consisting of pure alcohol, or alcohol mixed with acetic acid. This medium makes it possible for the artist to weaken the different colors more or less, and thus to produce darker or lighter tints; besides, it increases the penetrating capacity of the colors. The photographs, no matter on what paper or by what process they are made, are colored before they are mounted, without undergoing any previous preparations. It is only necessary that the print is flat, without creases or other defects. The print is placed on a retouching frame, or a similar apparatus, on which it can be seen by transmitted light, then the colors are applied with the brush, on the back of the print, and diluted with a certain quantity of the medium. It is only necessary to keep exactly the contours, or different outlines of the pictures. The colors possess an extraordinary penetrating capacity, and enter at once into the paper, for which they possess a great affinity. It is, therefore, very easy to control the progress of the work, and to apply the colors within the limits where they are necessary. The liquids which have served for the preparing of the colors evaporate very quickly, and only the coloring matter itself remains in the paper. By turning over the print it can be observed how the colors appear on the front, and it is possible to exactly judge the effect produced by the colors, and, if necessary, to strengthen them by the application of further tints. After the picture is colored to satisfaction, it can be mounted and burnished like any other photograph; small high lights and finishing touches, such as jewelry or other small details, can afterward be applied with ordinary body colors on the front side of the picture.—Photographisches Archiv., Photography.

An Electric Shock.

A curious accident occurred at Rochester, N. Y., June 20. Mr. Frank E. Grover, foreman of the Rochester Gas and Electric Company, who is employed at the power house at the lower falls, received a shock from the brushes of a series wound continuous current dynamo carrying its full complement of 60 series arc light street lamps. The electromotive force was thus nearly 3,000 volts. He was resuscitated after an hour and a quarter's hard work by a physician and three workmen. The men in the station had been made familiar with the D'Arsonval method, and they went to work at once to produce artificial respiration by raising and lowering the arms in rhythm and at the same time alternately pressing and releasing the chest. This was continued until a physician arrived. He ordered the treatment to be continued, though apparently the patient was dead. Shortly after Grover began to show signs of life and in a few minutes natural respiration set in and he soon was well enough to be sent home. The physician pronounces him out of danger. All agree he would have died had not artificial respiration been resorted to. There are many cases on record where death resulted from much less intense currents, while in some the voltage was as low as 500.

Electrocution.

By the laws of the State of New York the gallows and hanging for the execution of criminals condemned to death are done away with and the instantaneous electric current is substituted. This method has been employed in New York State for the past four or five years, and is generally conceded to be a vast improvement upon the common hangman's operations. If anything connected with the forcible extinguishment of the life of a criminal can be designated as humane, then the electric process may be rightfully so classed.

The most recent case of electrocution is that of a murderer named Buchanan, who was executed at the Sing Sing prison on the 1st of July.

The New York Herald gives a graphic description of the scene, by Mr. W. J. O'Sullivan, from whichwe make the following abstracts:

In the case of Dr. Robert Buchanan, who was electrocuted yesterday, every one present was surprised on his entrance. Without the least evidence of fear or bravado he came leaning on the arm of a clergyman, walked to the death chair without the slightest indication of hesitancy, and after seating himself followed with his eyes the process of strapping his legs and arms. There was no tremor of the lips nor nervous twitchings of the hands. To all outer seeming he was calm, and was undoubtedly courageous.

After the strapping was completed, and the leather mask and cap arranged, one of the electrodes was strapped below the knee, the other being in the cap put on the head. At a sign from one of the officials the electrician turned on the electric current, a sudden powerful and intense tonic contraction of the entire muscular system was seen, the body straightened, the legs and arms contracted vigorously, the leather binding straps creaked loudly, the entire surface of the body below the base of the neck blanched, the arms and legs became apparently and were actually bloodless, and Dr. Buchanan was dead.

As much confusion seems to exist relative to the lethal effect of the electric current as employed in electrocutions in this State, it may be of interest to describe the mode of employing the electric force at these executions.

In Dr. Buchanan's case, the first shock was given by a current of 1,760 volts and 8½ amperes. This lasted for seven seconds, and the current was lowered to 200 volts for thirty seconds, then raised to 1,740 volts for three seconds, and again lowered to 200 volts for seventeen seconds, when the current was cut off, the whole time during which the current was employed being fifty-seven seconds.

After this current had been shut off, the prison physician, Dr. Irwin, and a very experienced physician, Dr. E. F. Sheehan, of Sing Sing, who has attended nearly all the electrocutions, examined the neck to discover if the carotid arteries gave any indications of pulsating. The body of the unfortunate man emitted two gurgling sounds, with an interval between them. The electrician was instructed to again pass the current through the body, which he did, sending 1,760 volts of 8½ amperes for three seconds, and lowering the current to 200 volts for twenty seconds, when the current was shut off entirely.

The body was then examined by nearly all the physicians present, to determine if the faintest heart beat could be detected, and the consensus of opinion was that life was extinct—as the writer verily believes it was. After this examination the body was placed on the autopsy table.

To many the terms volts and amperes convey but an indistinct idea of the potency of the agent used to induce death, and the haziness of this idea has been materially increased by horror mongers who have exploited themselves recently through the press, the most noticeable feature of their lucubrations being the absence of the elements knowledge or disinterestedness.

If the reader will regard the voltage as the speed or velocity of the current and the amperage as the mass or volume of this same current, he will glean through this imperfect parallel some idea of what is meant. It is strange that those who have discussed this matter in the daily papers either wittingly or unwittingly avoid mention of the amperage, without which no estimate can be formed of the potency of the current or its energy. A locomotive and a bee may travel at the same rate of speed, say twenty miles per hour. That speed would, in the case of electricity, be the voltage. Should a person come in collision with the bee little damage would ensue, though the obverse would be the fact in the case of the locomotive. Wherein lies the difference, both having the same speed or voltage? It lies in the volume of the mass or body of each. This would be the amperage in the case of electricity, and if we multiply the speed or velocity by the weight or volume of the mass or body, we get the striking force, or what is termed in the case of electricity a watt, which is defined as the unit of energy or working power.

Fearing the foregoing very simple facsimile may not be sufficiently lucid, we can measure this energy by a better and more accurate method. Taking the current employed on Dr. Buchanan, 1,760 volts, 8½ amperes. If we multiply the former by the latter, we have 1,760 ×8½—equal 14,960 watts. Now it has been demonstrated by electricians that 746 watts equal one horse power. If we divide 14,960 watts by 746 watts, we get the potency of the current employed to kill Dr. Buchanan as equal to 20 horse power. Such power suddenly liberated in a human body can have but one result—to kill. It did kill, the death being sudden and painless.

In relation to the two gurgling sounds emitted, and which have been and will be magnified and exaggerated by caterers to the morbid and grewsome, it will only be necessary to recall to the reader's mind the fact that death by electricity is by asphyxiation, or as it is more popularly known, by suffocation, a death similar in this respect to one from drowning or strangulation, etc.

Castelar on the Press.

When I take in my hands a newspaper, when I survey its columns, when I consider the variety of its matter and the richness of its news, I cannot help feeling a rapture of joy for my age and pity for those ages which did not know this prodigy of human intelligence—the most extraordinary of all its creations.

I can understand states of society without the steam engine, without the telegraph, without the thousand wonders which modern industry has sown in the triumphal way of progress, adorned by so many immortal monuments; but I cannot understand a state of society which is without that great book of the daily press in which are registered by a legion of writers, who ought to be consecrated to the people, our afflictions, our perplexities, our fears and the degrees of perfection which are approaching in the work of realizing an ideal of justice upon the face of the earth.

If one day there were called to judgment all the institutions in which people so much rejoice, and were exhibited, each carrying in one hand the good it had done and in the other the evil, perhaps none could rise so pure as the press, and none would merit a benediction more justly due from the human conscience.—Emilio Castelar, Los Angeles (Cal.) Record.

RECENTLY PATENTED INVENTIONS.

Engineering.

CUT-OFF VALVE.—Franz Markgraf, New York City. This invention covers a simple valve mechanism contained entirely in the steam chest with the main slide valve, with which it acts in unison, being automatically controlled by the same means that controls the flow of steam to the valve. The latter has an arched steam duct entered by an induction port at the top of the valve, there being an exhaust cavity between the lower ends of the duct, a spring-pressed cut-off valve covering the induction port, a cut-off valve actuating device moving it against the stress of the springs. There is ample provision for correct adjustment to secure a critical regulation of the cut-off, and thus effect an economical and automatic regulation of the supply of steam to the cylinder.

Railway Appliances.

CONDUIT ELECTRIC RAILWAY.—Edward Ebi, Cedar Rapids, Ia. This invention contemplates the use of an all-metallic circuit in an underground conduit, although, if desired, the return may be effected through the rails. The trolley comprises oppositely projecting and pivoted arms carrying the trolley wheels, there being toothed gearing between the inner ends of the arms and the lower end of a vertical rod, by turning which the arms may be raised or lowered to throw the wheels into or out of contact with the wires.

CAR FENDER.—Isaac Macowsky, New York City. Journaled in pedestals attached to the car bottom are shafts connected by gears with a fender and with a crank arm from which an operating lever extends up through the car platform, the fender being normally held a certain distance above the ground, but being moved downward to rolling contact with the rails by the motorman or gripman actuating a hand or foot lever. The improvement may be applied to any form of car without interfering with the brake mechanism, or with its cable or electrical appliances.

CLAW BAR.—Louis Trauth and William D. White, Gretna, La. This improvement comprises a heel readily attached to the ordinary claw bar to serve as a variable fulcrum having a firm bearing at its bottom, and enabling the claw bar by a continuous movement to readily withdraw a spike without bending it. The heel may also be adjusted to give increased leverage and withdraw the spike in two movements.

ROLLING STOCK FOR SINGLE RAIL TRAMWAYS.—Charles Ewing, Barrackpoor, India. This improvement contemplates the employment of track and traction wheels, the latter only on one side of the rail, the car frame overhanging on the other side, and the equilibrium of the car being obtained by the weight of the traction wheels and their fittings, or the leverage gained by the distance of the traction wheels from the rails. The cars may be built at a low cost, being especially designed for use on a cheaply built railway, and to retain a full load over a badly graded road, as a substitute for wagon transportation.

Miscellaneous.

BICYCLE DRIVING GEAR.—Dan G. Bolton, Cooperstown, N. Y. This a changeable gear, applicable to wheels of any make, which may be readily changed from high to low gear, or vice versa, while the wheel is in motion. It has a large sprocket wheel journaled on a small one, with a driving connection between the two wheels, there being a loose back plate on the larger wheel and a locking block moving radially on the plate engaging teeth on the inner side of the large wheel.

FOLDING BOAT.—John H. Rushton, Canton, N. Y. This boat has a solid bottom, canvas sides to the upper edges of which a gunwale is attached, and braced uprights hinged to the bottom supporting the gunwale. All parts of the framework and bottom are attached together, so that when folded the parts cannot get lost, and in setting up all the parts are easily brought to their proper position.

MACHINE FOR DEHAIRING FUR SKINS.—Conrad Schirmer, Brooklyn, N. Y. This machine provides for the use of two brushes in connection with a comb for separating the fur to expose the hair or bristles to be clipped by the shears, one of the brushes being a reciprocating brush operating in conjunction with the comb, while the other brush is held in stationary yet adjustable bearings, instead of being reciprocated, as in other machines of this character. The shears have a straight up and down cut, and may be readily brought into operation or rendered inactive as desired, while the feed for the skin being operated upon is automatic.

SUGAR MILL SHREDDER.—Cyprien Dube, Havana, Cuba. Combined with the endless conveyer and chute carrying the cane to the mill is a series of toothed disks on a shaft which act on the cane to reduce it to longitudinal shreds. A roller holds the cane down on the conveyer and prevents its escape from the action of the toothed disks, there being guards between the disks to prevent the carrying over of the cane. The improvement is designed to insure a more complete extraction of the juice and to economize power by putting the cane in the best condition for the most effective action of the rolls.

DEFECATOR.—Louis Amedee Roussel, Patterson, La. This improvement comprises a vertical scum delivery stand pipe in a pan, an adjustable funnel on the upper end of the pipe and a coil of pipe in the base of the pan, with means for heating the juice in the bottom of the pan with gradually diminishing heat from the outside of the vessel toward the center, to cause the scum to rise to the surface and float to the funnel. A pipe discharging through perforations at the level of the liquid in the pan forces the scum to the funnel, effecting perfect defecation without manual labor.

EVAPORATING PAN.—William S. Ballou, Bainbridge, Ga. This is an improvement in cooler and skimmer attachments for ordinary sirup boiling kettles. It is an apparatus to be applied to an ordinary kettle to enable the sirup to be rapidly boiled over a hot fire without attention, the sirup being moved over and over to and from the kettle, and being passed through a strainer and skimmer, so that it is effectually cleaned and only pure sirup left in the kettle.

CALIPERS.—George Harris, New York City. This instrument has sectional arms or legs pivoted at their upper ends to the opposite ends of a body section formed of curved or bowed central parts, with an adjusting device for regulating the movement of the body members toward and from each other, and the instrument having a micrometer adjustment.

PORTABLE STRUCTURE.—Laurence Nolan, New York City. This is a foldable frame adapted for supporting shelves or other purposes. It has pairs of legs pivoted at their middle and pivoted jointed arms connecting them at this point, pivot bolts passing through the upper ends of the legs of each pair, and stirrups pivoted on the bolts to adapt them for attachment to a bar.

HAME FASTENER.—John N. Goodall, Portsmouth, N. H. This device comprises a slotted barrel through which extends a screw having right and left threads, nuts carried by the screw projecting through the slot and hooks on the nuts engaging the eyes of the hames. The device is intended to take the place of the ordinary strap and buckle, may be readily applied to the hames to clamp its two ends together and adjusted by simply turning a thumb piece.

SASH SUPPORT AND LOCK.—William W. Dwigans, Arkadelphia, Ark. This improvement comprises a curved pocket near the lower end of the side bar of the sash, and a number of curved pockets in the bead strip, push pieces entering the pockets and projecting out through the bead strip, while a ball between the sash and bead strip is adapted to enter the pockets. The device effectively supports the sashes at different points of elevation and automatically locks the window in closed adjustment.

WASHING MACHINE.—Levi B. Pettit, Bridgeton, N. J. This machine consists of a tub in which is a semi-cylindrical rubbing board, and the cover of the tub has a central ball socket through which projects the shank or handle of a rubber, the clothes placed on the board being rubbed by moving the handle back and forth. On the tub bottom is a sliding rack which may be pulled out to afford a support for clothes before or after they are washed.

CORD FASTENER FOR ENVELOPES.—Malcolm Scougale, Fort Worth, Texas. For securing a cord on a merchandise envelope or like package, this invention provides means for permanently holding one end of the cord and temporarily securing the free end when desired. The device comprises a pair of opposed apertured disks, the outer one convex on its outer surface, and a head above it on a shank extending through the disks. The shank proper as well as the head is of two thicknesses, the cord being securely held by forcing it between the members of the shank.

TOOTH BRUSH.—James W. Dennis, Cincinnati, Ohio. The brush, according to this invention, is so connected with the handle that it may be carried to various positions, and when placed at an angle will be some distance removed from the handle. The improvement provides a universal joint or connection whereby a head may be attached to the handle to receive heads of different brushes.

BASKET.—Lewis Bennett, Schuyler, N. Y. This is a strong and light basket, which may be cheaply made, and is more especially designed for use on farms. It is made of a single piece of sheet metal pressed or stamped into form, and having at its upper edge a hollow rim, filled by a wooden strip, while its curved sides are provided with a series of annular encircling folds.

ADVERTISING SIGN.—Joseph P. Pappin, Brooklyn, N. Y. To serve as bulletin boards, to be set temporarily on the sidewalk in front of stores, etc., this inventor has devised a simple construction, not liable to be upset by the wind, and which may be conveniently folded to store the sign in a small space. It consists of two hinged frames covered by sign sheets made of a single piece of sheet metal, the connecting or top portion of which forms a hood for the upper jointed ends of the frames, and forms also a spring for closing the frames.

MATCH BOX AND CIGAR CUTTER.—Isaac L. Townsend and John Conway, Perry, Iowa. In this box the matches are so placed that by the pressure of a button a match is delivered, and when it is withdrawn it is also lighted. In a compartment at one end of the box is also arranged a knife or cutter, moving beneath apertures in which a cigar tip may be placed, and adapted, on the pressure of a button, to cut off the cigar tip at the same time that the match is pushed out.

SAFETY PIN.—Ephraim B. Lee, Weston, Mich. This is a pin made of a single piece of spring wire, and adapted to be easily locked and unlocked when placed in or removed from the goods. Its tension and operation are such that when the pin is removed from its sheath it does not fly outward, but always remains under cover or in close proximity to a shoe, constituting a lock which protects its point.

LADIES' HAT OR HAIR PIN.—Paul Jeanne, Greenville, N. J. This is an ornamental pin having a movable part arranged to readily change its position on the slightest movement of the wearer's head The invention comprises a casing carrying a vertical shaft, and a sleeve removably connected with a supporting bar or pin carrying an ornament, the shaft locking the sleeve to the bar or pin. The turning of the shaft and ornament at each motion greatly heightens the effect and appearance of the device.

Designs.

PLATEAU FRAME.—Philip F. Schaefer, New York City. This is a low round stand whose supports each consist of an animal's head and leg, in foliated ornamental work, the body being surmounted by a border comprising a band and a series of small figures.

TOBACCO PIPE.—Pearsall B. Jackson, New York City. In this pipe the stem, at the portion adjacent to the bowl, represents an athlete's shoe and stocking, as if on a foot and leg, the bowl rising from the instep and ornamented to simulate a football.

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.