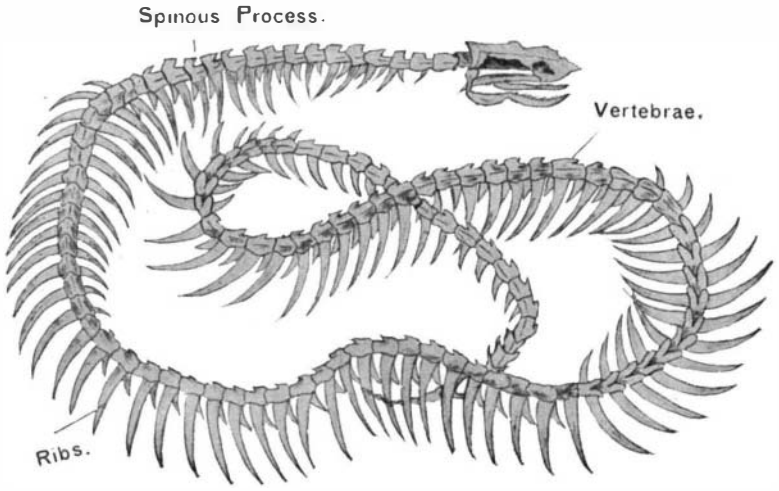
SOME OF OUR COMMON SNAKES.

M. C. Holmes, of Germantown, recently read before the Philadelphia Natural History Society the following paper:

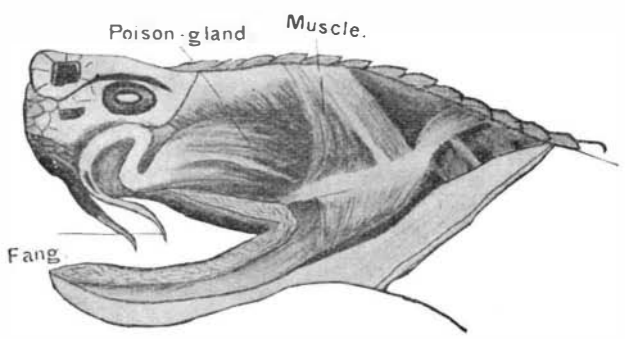
It seems strange that the snake, though one of the most interesting, is the least favored of all members of the animal kingdom; therefore, its peculiar structure, beautiful coloring, and graceful movements are seldom appreciated. This dislike and aversion once overcome, the life and habits of the snake become a most pleasing study. As all know, snakes are scaly reptiles, with long, cylindrical bodies that crawl along the ground without the aid of limbs. Some of these animals, however, still retain vestiges of the hind legs, and an examination of the skeleton reveals remnants of the bony framework of the pelvis and hind limbs—showing clearly the snake's descent from reptiles endowed with four complete limbs. The jaw bones seem to be a combination of elastic springs having no limit to their tension; and the two branches of the lower jaw are united at the chin by a ligament, so as to be capable of wide separation. In order to further enlarge the capacity of the mouth, this same arrangement is sometimes found also in the upper jaw, while the jaw bones and those of the palate are movably joined together, which allows the snake to devour prey much larger than the normal caliber of the mouth and throat. A peculiar feature of the snake is the number of vertebræ making up its long, tapering backbone, numbering 400 in some species. The skeleton is arranged to allow the greatest amount of freedom, the vertebræ being hollow in front, convex behind, and furnished with extra articulations, a rounded projection from one vertebra fitting into a corresponding hollow on the next, literally working on a ball and socket plan.



SKELETON OF RATTLESNAKE.

No less remarkable than the number of vertebræ is the number of ribs; in fact, from the head to a long way down the tail, each joint of the backbone has attached to it a pair of ribs. In ordinary land vertebrates the ribs are largely connected with the function of breathing; but in snakes, as well as supporting the walls of the trunk, and thus keeping open the cavity of the chest, the chief function of these ribs is in progression. The majority of snakes have on the under portion of the body a series of large, transverse, horny plates or shields, which are much wider than long, and which correspond to the terminations of the ribs. By holding on to the rough portions or inequalities of the surface which they are traversing with the free edges of these shields (which free edges extend backward), and then drawing close together the ribs on one side of the body and afterward those of the other side, the snake produces that well known undulating movement we call wriggling; then, by straightening out the front part of the body, and, when a firm hold has been obtained, drawing after it the hinder portion, progression is effected.

Harmless snakes generally have two rows of teeth in the upper jaw and one in the lower, these teeth being slender, sharp, comparatively short, and not set in sockets; as these animals do not tear or mutilate their food. The teeth are simply used as hooks by which the food is drawn into the snake's throat. The bones of the jaw being movably joined together, the teeth are advanced on one side, securing a hold on the prey, and then on the other, in which way the swallowing is



HEAD OF RATTLESNAKE (CROTALUS HORRIDUS), SHOWING POISON GLAND AND FANG.

accomplished. Poisonous snakes have two long, sharp fangs which appear to be flattened out like a knife blade and then bent up, forming a groove, in some cases forming a closed tube, open, however, at both ends, the upper end of which is fastened to a bone in the cheek which moves with ease, so that the fangs when not in use can be folded or packed away. The saliva of all animals, even man, contains poison; though in man it is greatly diluted and of use in assisting digestion. In the poisonous snakes it is collected into sacs or glands placed on each side of the upper jaw. A delicate canal extends from the poison gland forward under the eye to the edge of the jaw and there opens into the fang, and to use the poison the snake has but to strike the prey; as the fangs enter the flesh the muscles of the jaw press upon the poison glands, squeeze the poison through the little canal down through the hollow of the poison fang in the wound. There is a most ingenious arrangement in the fang. The opening is not at the very tip, where it would be liable to get plugged up with skin and flesh, but it is a little way up in front of the groove, so that the sharp point goes in first and makes a little hole into which the poison flows.

Snakes vary greatly in color, some being very beautiful, and in many cases their coloration is highly protective, green snakes occurring among a luxuriant vegetation, while gray snakes generally frequent rocky districts. The skin, which consists of a coat of scales, formed from the epidermis and generally overlapping each other, is shed during the summer months. The eyes have no lids, being covered with a delicate film or membrane, giving to them that stony stare with which we are more or less familiar. The poisonous snake has a large, flat head and a short, thick body, and as a rule possesses a vertical keel along the center of the scales, while the non-poisonous snakes have small heads, long bodies, and no keel on the scales.

Perhaps of our poisonous snakes the best known are the rattlers. The Northern rattlesnake (Crotalus horridus) has the widest geographical range, being found in nearly every State of the Union from the Gulf of Mexico to Northern New England and west to the Rocky Mountains. Its appearance is not very pleasing, it having a large flat head, brilliant eyes, and between the eyes and the nostril a deep pit. The horny appendage to the tail, which is termed the rattle, and gives to the snake its distinctive name, consists of a number of hollow dry rings ending in a rounded button, which rattle together when the tail is vibrated, which vibrating or rattling is done whenever the snake is alarmed. The exact use of this rattle is not known; but it is supposed that the animal is provided with this appendage because it lacks the power of hissing. The idea that a rattle is added every year is not borne out by facts. A specimen owned by one observer, Dr. Holbrook, developed two rattles within a year. Mr. Peale, the naturalist, kept a rattler for fourteen years. When he obtained it, it had eleven rattles, and during the fourteen years it lost several; but new ones took their places, so that at the end of this time the snake still possessed eleven rattles. In disposition the rattlesnake is mild and peaceful when not provoked, and will submit to a great amount of teasing before showing any signs of retaliation. A friend of mine, when a little girl, amused herself for nearly an hour teasing a rattlesnake while it was lying in a clump of blackberry bushes, by throwing stones at it and poking it with sticks. A rattler scarcely ever goes out of its way to attack a human being. It can strike stretched out at full length quite as well as when coiled, despite the prevalent idea to the contrary.

The rattlesnake's alleged powers of fascination—in fact, the powers of fascination of any snake—are simply mythical. It is only that the presence of the animal so inspires the individual or animal with horror that they become fairly paralyzed with fear, just as a person crossing railway tracks will become so horrified at the sight of the near-approaching locomotive or trolley car as to be stupefied with fright and unable to move out of danger; yet no one would say that the person had been charmed or fascinated by locomotive or trolley car. So with snakes. Their presence so inspires the victims with fear that they are unable to move out of their way and are consequently attacked; so that in reality the rattlesnake is not the dreadful creature it is often made out to be, but a perfectly inoffensive, harmless animal when let alone.

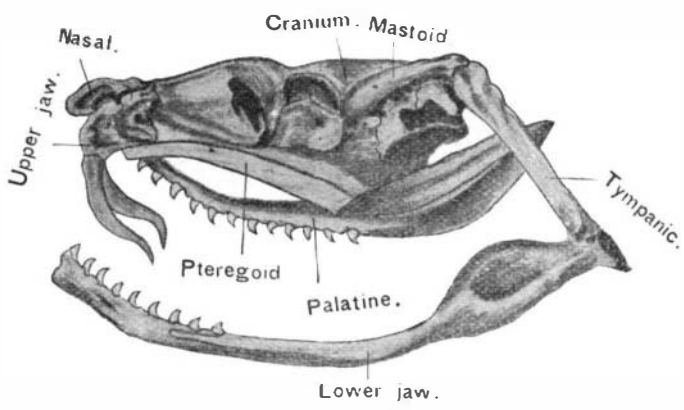
In the secluded parts of Pennsylvania and on the shores of Lake Champlain these snakes are abundant. In Sullivan and Ulster Counties, New York, many men are employed as professional rattlesnake hunters, as the skin is very valuable for making belts, pocketbooks, card cases, etc., and the oil is sold for a large sum, being believed by some to possess great curative powers. Many of these snakes are killed during the summer months, but the grand hunting season is in fall, when the reptiles have returned for the winter to their dens. The hunters well know these places of retreat and choose for the hunt a bright, sunshiny day in October or November. When the snakes have come out of their holes to bask in the sun, lying on the rocks huddled together in great numbers, the hunters arm themselves with old-fashioned flails and attack group after group of the reptiles, but few of them escaping.

There are seventeen species of this snake in the United States. The diamond rattler (Crotalus Adamantus) is strictly a Southern species, found south of the Carolinas; and in the same locality is found the ground rattler. The greatest variety, however, seems to occur in the Western States, Arizona and New Mexico containing several different species, while in California and Oregon is found the Crotalus Lucifer, or black rattler.

Their bite is extremely dangerous but not necessarily fatal. Most animals succumb to it, and man, if proper remedies are not at hand. In most localities there is some one who has a remedy for snake bite, but the most effective, perhaps, is whisky. Onions are also very good, as, when applied to the wound, they will draw out the poison. Prof. Frazer, of Edinburgh, discovered that the serum of the blood of an animal whose whole system was impregnated with snake poison, or the blood serum of the poisonous reptile itself, is an excellent remedy for snake bite. He found out the minimum dose required to kill an animal, and, starting with an amount much smaller than this, gave the dose to the animal, increasing the dose at intervals of ten days until he found that the animal was taking fifty times the minimum dose, or enough snake poison to kill fifty animals of its own weight and size, without developing any bad effects therefrom. He then injected into a healthy animal some snake poison; and soon as it began to produce a bad effect on the animal, he immediately injected into the wound the blood serum of the poisoned animal, which serum immediately counteracted the bad effects of the poison. This, certainly, is a most valuable discovery.

Another snake perhaps more feared by some than the rattler is the copperhead (Ancistrodon contortrix), known as the cotton-mouth moccasin and red eye in the South. It ranges from the Catskills to the Gulf States and west of the Mississippi River: generally attains a length of two feet and inhabits grassy meadows, also mountain regions, where it preys upon small animals, rarely attacking large ones, unless stepped upon. Sometimes cows and horses, not seeing the copperhead in the long grass, accidentally tread on it and are immediately bitten. The bite of the copperhead is poisonous, but not necessarily fatal, when proper remedies are applied.

The water moccasin (Ancistrodon piscivorus) is of a very pugnacious disposition and will with savage ferocity attack both man and brute. It is found from the Pedee River to the Gulf States. In Texas there is a species known as the Texas moccasin, but the great



SKULL OF RATTLESNAKE.

stronghold of this animal is the great swamp of Southern Florida. These reptiles are essentially watersnakes and live principally upon fishes and small reptiles.

The care of the snake for its young is a question which has been very much discussed, a great many instances having been recorded of eye witnesses to the parent snake taking, when alarmed, its young into its mouth; whereas, noted naturalists have asserted they have never been able to discover this trait in the snake. A gentleman living in Georgetown, South Carolina, discovered that the shrubbery on his lawn near a stream was tenanted by a water moccasin; and, locating the snake one day, he placed a rabbit on a log near the stream and removed a short distance to watch the snake, which, when it spied the rabbit, immediately

descended from the bushes and crawled along by the log to the rabbit. When the moccasin had the prey about half way down its throat the gentleman approached, when the snake suddenly disgorged the rabbit, and, making a noise like a shrill whistle, a number of small moccasins quickly ran out from under the log, entered the snake's mouth, and she rapidly crawled away. It would seem, therefore, that the moccasin used this means for protecting her young. The rattler and copperhead are also supposed to resort to this habit when alarmed.

Perhaps one of the most beautiful snakes of the United States is the harlequin (Elaps fulvus). This snake has permanently erect poison fangs, is venomous but not fatal, and of an extremely mild disposition. Its coloring is exceedingly rich and beautiful, being red, with seventeen broad black bands bordered with yellow. The harlequin is found from Virginia to Arkansas, while four other species inhabit Florida and Texas. They spend most of their time underground, often being turned up by field workers, and seem to have a particular fondness for sweet potato patches.

The black snake (Bascanion constrictor) is of a beautiful steel blue color. It is wild and untamable, and particularly bold during the breeding season—very often going out of its way to attack passersby, and will sometimes chase an intruder for quite a distance. The black snake is a powerful foe of the rattler, who, being of a sluggish disposition, is easily overcome and squeezed to death. This snake is a great climber and preys upon birds in their nests, seeming to prefer the cat bird and red wing, often penetrating thickets in search of them. This reptile is an inhabitant of the region east of the Rocky Mountains, where it is a very familiar form, always in districts where there is water.

The coachwhip (Bascanion flagelliformis) is a long, slender form of the Gulf States, which has been vested with remarkable powers by the Indians on account of its rapid movements, and by them has been made the subject of many legends, which are still believed by some, particularly the negroes, who assert that the snake has the power of cutting its antagonist in twain, and can take its tail into its mouth and roll along the ground like a hoop. There is a story current among the negroes that a little boy who was playing in a field one day was attacked by one of these snakes, which lashed his limbs just above the ankles, entirely cutting off both feet. This is, of course, a myth. The species inhabits the Southern States as far west as the Mississippi River.

The Ophibolus triangulus, or milksnake, is found from Canada to Virginia; also bears the name of thunder and lightning snake, chickensnake, and house snake; the latter as it often frequents cellars and outhouses, where it preys upon mice and other small vermin. It also feeds upon snakes and lizards. The milksnake is very graceful in its movements and reaches a length of four feet. Its disposition is exceedingly pugnacious, which trait it exhibits when very young.

A more Southern species and nearly related to the milksnake is Ophibolus getulus, or chainsnake. This, like most of the Southern snakes, is a very beautiful reptile, being of an intense black ornamented by a series of narrow white rings arranged one after another in the form of a chain, whence its name. The negroes hold it in high respect, calling it the king of snakes, from the fact that it is the deadly foe of the rattlesnake. The chainsnake lives on lizards and small birds, as well as weaker members of its own species. The hognose or blowing adder is a large, unsightly snake found in the Eastern United States, but is perfectly harmless, spending most of its time basking in the sun. When one meets it, it does not try to escape, but flattens out its head and body and seems all ready to strike. This it rarely does; but should it strike, it can do no harm, being non-poisonous.

A very active but a very timid snake is the pine or bull snake, deriving its name from its wonderful bellowing note, much like that of a bull, produced by filling its body with air, which it noisily expels. This snake ranges east of the Mississippi River and south of the Ohio. It burrows holes in the ground into which it rapidly retreats when approached and emits a very sickening odor, thought to be a sort of defense. The odor is so sickening that one approaching the snake is very apt to stop for a moment to find out what it is, thus giving the snake time to retreat.

The water snake found in the Eastern United States is a most harmless, inoffensive creature, found almost always in meadows near pools and streams. It is often seen around watercourses, hanging from the branches of trees over the streams, into which they rapidly drop when approached. A water snake, having thus taken to a stream, was observed to swim quite a long distance, keeping its head well out of water, when suddenly it opened its mouth and a number of little water snakes ran into it.

A very beautiful snake is the green Leptophis aestivus, which is very common in the South. It is of a brilliant green color and a perfect mimic of a vine—often surprising one by starting up from among the leaves of a vine and darting away. It has a habit of coiling in birds' nests, but is perfectly harmless and, like our common green snake of the North, is easily tamed.

The Virginia striatula, which is found in the South of Virginia and Texas, is a very pretty little snake, but is very modest and retiring. Its back is a beautiful reddish brown and its under surface salmon colored; but we are not often favored with a view of this pretty reptile, as it is nearly always hidden away under some log or old fallen tree or pile of dead leaves.

The most familiar form of all is the garter-snake, a non-poisonous reptile, of which the United States contains ten species. This snake is the first to crawl out in early spring, and the number found around streams at this time is remarkable. At this season of the year they are always hungry, and one snake has been known to eat three adult toads within an hour. These snakes are perfectly harmless and easily tamed, so that they will even feed from the hand.

Lithium.

Recent researches on metallic lithium have shown that this metal cannot be distilled in either hydrogen or nitrogen gases, vigorous combination occurring in both cases. The metals of the alkaline earths would appear to behave similarly: so that if it should be necessary to heat these substances in an indifferent gas, argon or helium must be employed. In a recent number of the Comptes Rendus M. Moissan shows that if pure calcium be heated in hydrogen the metal takes fire and burns energetically, forming the hydride CaH_2, a transparent crystalline substance which is stable at a high temperature. It behaves as a strong reducing agent and is violently decomposed by cold water, giving off one-seventh of its weight of pure hydrogen gas. It differs from the corresponding lithium hydride in that nitrogen is without action upon it at a red heat.

The Current Supplement.

The current SUPPLEMENT, No. 1194, is commenced with an article entitled "Visit of the German Emperor to the Holy Land," with illustrations and sectional view of the imperial yacht "Hohenzollern," used by the Emperor on his tour, with views of the Holy Sepulcher, the Golden Gate, and views in the sacred city. "The Progress of Electro-Metallurgy in 1897" is an important paper. "The New Prison of Fresnes" describes new prisons which are to take the place of the crowded and unsanitary penal institution in the French metropolis. "Artists' Colors" is a paper giving a quantity of out of the way information. "The Liquefaction of Gases" is a fully illustrated article, describing many interesting experiments. "The Chemical Purification of Potable Water" is an article on the new type of filter. Prof. Brabrook's article on "Anthropology" is continued.

Contents.

(Illustrated articles are marked with an asterisk.)

RECENTLY PATENTED INVENTIONS.

Mechanical Devices.

APPARATUS FOR MIXING TEA.—CHARLES H. BARTLETT, Bristol, England. The device of this inventor belongs to that class of mixing apparatus in which the tea is discharged through an axial aperture in the end of the mixing drum. The discharge-chute is permanently mounted within the front trunnion of the drum. Into the drum the chute projects in order to receive the tea from the mixing and discharging pallets. The chute extends outwardly as far as may be desired, and is carried preferably by a circular plate fitting the aperture of the trunnion, but prevented from turning with the drum. The inwardly-projecting or receiving part of the chute is provided with a sliding cover, by means of which the tea is prevented from being delivered to the chute while the mixing is in progress. The drum is provided with internal helical blades whereby the tea is brought to cups at the front end, which cups deliver the tea to the discharging-chute. So long as the cover remains closed, the tea deposited thereon falls back on one or more helical conveyers of a twist reverse to that of the blades. By this means the tea is returned to the rear end of the drum.

TYPE-WRITING MACHINE.—WILLIAM P. QUIMBY, Gettysburg, Pa. The essential feature of this invention is found in an improved mechanism, by means of which the lines may be spaced any desired distance by the operation of the spacing lever. In carrying out the invention, the spacing lever employed is made to turn the platen. In connecton with the spacing lever and the means whereby its movement is imparted to the platen, devices are used which operate to vary the extent to which the movement of the lever is imparted to the platen. Hence, the distance to which the platen is moved by the spacing lever may be varied without changing the movement of the lever. A uniform movement of the spacing lever is thus secured, and a varying movement of the platen effected, to secure thereby a very narrow or wide spacing, or any intermediate spacing.

COMBINATION-LOCK.—JAMES W. MINER, Johnstown, N. Y. This invention provides an improvement in such combination-locks as are used on safes, vaults, and the like. The lock has two combinations of tumblers, working independently, but operated by a common spindle. By turning the handle of the spindle, either combination can be thrown out of action, or moved by a common cam on the operating spindle into engagement with a locking bar. The peculiar merit of this invention resides in the possibility of employing so many combinations of tumblers that it would be well-nigh impossible, to one not knowing which combination is in engagement with the locking bar, to pick the lock.

Miscellaneous Inventions.

FURNACE-CLEANER.—CHARLES M. MCCAMEY, Denver, Col. The purpose of this invention is to furnish an attachment for fire-boxes, by means of which attachment the ashes may be quickly removed from a grate. The furnace is provided with a rigid dead-plate located forwardly of the grate-bars and provided with an opening through which clinkers may be dropped into the ash-pit. A cover commands the opening, is mounted to slide back and forth on the dead-plate in a plane parallel with that of the plate, and is supported by continuous engagement with the top of the dead-plate.

EXTENSION SHADE AND CURTAIN-POLE HOLDER.—FRANK T. RICE, Tower City, N. D. This curtain-shade and pole-holder comprises a frame formed in two sections sliding longitudinally on each other. Each section has its outer end bent inwardly in the form of a U. A shade-holding fixture is mounted to swing on each inwardly-bent end of the sections. Each fixture has a flange which serves to limit the outward movement thereof, and each is capable of swinging into a plane with the frame-sections. Pins are carried by the frame-sections at points outwardly from the adjacent shade-holding fixtures. Pole-supporting brackets are carried on the pins. For each frame-section a hanger is provided. Each hanger has a loop with which the blocks are engaged, by this means connecting the haugers with the frame-sections.

FOLDING CHAIR AND ROCKER.—RUDOLPH LUND, Cincinnati, Ohio. In this folding-chair, two inverted U-shaped leg-frames are pivoted together in order to enable one to fold within the other. An inverted-U-shaped back-frame has its side members pivoted a short distance from their ends to the upper portions of the side members of one of the leg-frames. The lower ends of the side members of the back are formed with inwardly-projecting lugs. A seat and back of flexible material are secured to the cross-bar of one leg-frame, passed under the cross-bar of the other leg-frame and secured to the cross-bar of the back-frame.

WAGON-BODY.—LYSANDER J. LISHNESS, Bad Axe, Mich. This invention provides a wagon-body having a superstructure at its sides, which structure may be arranged perpendicularly to form a stock-rack, and which may be thrown outwardly to form a hay-rack. The device constitutes a desirable form of wagon-body for use on farms or places where produce of light weight but of large volume must be transported to some distance.

BAG-FASTENING.—CONSTANT LE DUC, South Park, N. J. The fastening of this inventor has staples secured to one side of the bag-opening and projecting from the inner side of the bag. The other side has slots which receive the staples. A flap is connected with the side having the staples. A bar is attached to the flap and is provided with means for engaging the staples to lock the two sides together.

MEAT-BEATER.—MARSHALL E. HUNT, Belle Plain, Iowa. This device for beating meat in order to cause it to become tender has a handle, a body-bar attached rigidly thereto and extending transversely with reference to the handle, and a number of fingers projecting transversely with reference to the handle-bar and supported rigidly thereon. The fingers extend parallel with one another from the side of the body-bar opposite the handle, and are each provided with a series of annular projections spaced apart. These projections cut into the meat, but do not mutilate it beyond the necessary degree to make it tender.

SHAFT OR TONGUE COUPLING.—KNUT BULAND, Linn Grove, Iowa. The purpose of this invention is to produce a shaft and tongue coupling which will enable the shaft or tongue to be quickly removed from a carriage and another substituted in its place. This is attained by attaching to the rear end of the shaft or tongue a forwardly-facing hook, which is adapted to engage a pivot-pin; and by locking the hook in position by securing to the shaft a spring-held block adapted to fill the space between the pivot-pin and the axle, when the shaft or tongue is raised, thus preventing the hook from being disengaged until the shaft or tongue has been dropped to such a position as to remove the block.

DUMPING-WAGON.—THOMAS WRIGHT, Jersey City, N. J. In connection with the sill-frame of a wagon-body, and a gear-frame whereon the sill-frame is normally seated, this inventor employs a number of rock-arms pivoted on the side-beams of the gear-frame. Carrier-bars are held in parallel planes by transverse shafts passing through the carrier-bars and also through the ends of the rock-arms. Rollers are located on the outer ends of the transverse shafts. Means are provided for raising the rock-arms to press the rollers upon the sill-frame and adapt the sill-frame to roll thereon.

SLEEPING-BAG.—SARAH WINTERS, Seattle, Wash. This device is composed of a casing constructed of cloth and eider-down. The purpose of the invention is to provide a cover for persons sleeping in arctic climates. The bag is made of a fabric having an inner and outer layer of cloth, between which the eider-down is quilted. The interior of the bag is provided with a pillow. The bag is formed with flaps, so that the person using the bag may be completely inclosed.

DOOR-GUARD.—JEFFERSON NAGLEY, Marysville, Wash. The object of this invention is to provide a means whereby persons will be prevented from placing their fingers accidentally in the door-opening where the hinges are located. To this end, the inventor has devised a guard consisting of a flexible sheet adapted to be secured to the door and to the jamb, crossing the opening at the place where the door is hinged. Auxiliary hinges are attached to the door and jamb, the members of which hinges are carried at an angle to the door and jamb within the flexible sheet.

FEED-REGULATOR.—OLAUS JOHNSON and PEDER P. HOLT, Northwood, N. D. The feed-regulator of these inventors is designed for use upon roller-mills for feeding material uniformly to the burs. In addition to the means for regulating the flow of the material to the burs, provision is also made for catching and holding nails, screws, and other hard objects, which would otherwise injure the burs and stop the mill. The regulator consists of a casing, a fluted feed-roller mounted therein and having one end reduced in size, and spring-plates underlying the reduced end of the roller. The spring-plates are curved beneath the roller so as to come close to the roller and be adapted by reason of this proximity to regulate the flow of feed.

SWIMMING APPLIANCE.—JACOB STROUP, Washoe, Idaho. The object of this invention is to produce a simple device which may be attached to the ankle and foot of a swimmer, and which, when so attached, will be expanded to secure a purchase upon the water when the foot is forced back in making a stroke. To the accomplishment of this object, the invention consists in employing a curved ankle-plate provided with a stirrup or straps by means of which it may be located upon the rear side of the ankle, and with a pair of light metal wings to which are secured webs.

Designs.

COLLAR OR CUFF BUTTON.—FRANK W. TAYLOR, St. Paul, Minn. The spherical head of this button, according to the design, has running through it a bar beveled at its ends. The shank of the button is flattened and formed on the button-disk. The bar enables the button to be readily inserted and prevents its dropping out. The flattened shank prevents the button's turning around.

WALL-PAPER.—ARTHUR MARTIN, Paris, France. This design consists of a bouquet of flowers of different varieties tied by a ribbon knot, the ends of which appear as scrolls, and streamers of honeysuckles connected with the stems of the bouquet.

GRAVE VAULT.—ELZIRA HUBBARD, Carlinville, Ill. The leading feature of this design consists of an arched top having convex sides, end and bottom surfaces, and flanges at the meeting of the top with the body, the flanges interlocking. The shape of the vault is such as to permit ready manipulation of the whole.

NOTE.—Copies of any of these patents will be furnished by Munn & Co. for 10 cents each. Please send the name of the patentee, title of the invention, and date of this paper.