

BOA CONSTRICTORS.

In the SCIENTIFIC AMERICAN of August 8 and August 22 appeared a number of illustrations representing various snakes in characteristic positions, with a description of their habits, by Mr. G. R. O'Reilly, who has traveled much in search of snakes and reptiles, and who finds no difficulty in making captive, in a live state, the most generally dreaded serpents. Our illustration shows his easy manner of handling a boa constrictor at the Central Park Museum. Of course, it is not to be inferred that the snake thus easily mastered is of a size and power equal to that represented in the famous Laocoon marble, if such monstrous serpents ever existed, but it is none the less a true boa of very respectable size, such as are widely distributed in tropical America.

The name *boa* has been generally applied to several varieties of large serpents which kill their prey by constriction, and do not have poison fangs, the European variety being known as pythons. The true boas are abundant in Guiana and Brazil, where they are found in dry, sandy localities, amid forests, and on the banks of rivers and lakes, some species frequenting the water. They feed chiefly on the smaller quadrupeds, in search of which they often ascend trees. The size of their prey often seems enormously beyond their capacity for swallowing, but the creature's jaws are merely connected by ligaments which can be distended at pleasure. Its mouth can be made to open transversely as well as vertically, the two jaws not being connected directly but by the intervention of a distinct bone, which adds greatly to the extent of its gape. It has also the power of moving one-half of the jaw independently of the other, and can thus keep a firm hold of its victim while gradually swallowing it. The upper jaw has a double row of solid, sharp teeth, and there is a single row in the lower jaw, all pointing inward, so that, the prey once caught, the boa itself could not easily release it. Their immense muscular power enables them to crush within their folds quite large animals, which they first lubricate with saliva and then swallow whole by their immense dilatable jaws and gullet. After feeding they become inactive, as is the case with most other reptiles, and remain so while the process of digestion is going on, which, for a full meal, may extend over several weeks, during which period they may be readily killed or captured.

The eggs of the boa are about the size of hens' eggs. About fifteen years ago a boa at the Central Park menagerie laid twenty-one eggs, making the deposit in sight of her keeper, and it was especially noted that each third egg laid was sterile. The fertile eggs had each a young boa within; one came out of its shell immediately after being laid, but soon died, and all the others died in their shells.

The boas of tropical America, where the specimen shown was captured, never reach the size attained by the great pythons, of the same family, of Hindostan, Ceylon, and Borneo, some of which are said to grow to thirty feet in length, and to be able to manage a full-grown buffalo. A specimen which was brought from Borneo to England was sixteen feet long and eighteen inches in circumference. A goat was placed in the cage of this boa every three weeks, and during the process of swallowing, which occupied over two hours, the skin of the snake became distended almost to bursting, the points of the horns apparently threatening to pierce the coat of the destroyer. The whole animal was so completely digested that nothing was passed but a small quantity of calcareous matter, not equal to a tenth part of the bones, and a few hairs.

The skin of the boa was the object of serpent worship among the Mexicans, and a specimen of a skin which was so used is preserved in the British Museum.

Steinhell's Lens Manufactory in Munich.

The new workshop erected by the firm is situated about twenty minutes' walk from the town, in the neighborhood of the Bavaria restaurant. Work was commenced in the building on March 1 of the present year, and about fifty workmen are now employed. The whole is two stories in height, and consists of a central building with wings, in which the workrooms are situated. Of these there are some fifteen of various dimensions, but all are lightsome and airy, the smallest of them having a surface of thirty square meters. In these rooms the grinders, polishers, mechanics, carpenters, etc., carry on their operations. The first floor contains the dwelling apartments of the manager, while the second floor contains a commodious testing room, sixteen meters by seven meters, in which all the lenses, apparatus, etc., turned out by the firm are

made of pitch, instead of on cloth, as in many other manufactories, which enables a more perfectly spherical surface to be obtained. All the lenses are polished separately, and not *en bloc*. A two horse gas engine, working in the cellar, drives the polishing machinery, lathes, etc. Sometimes three or four polishing machines are coupled together and driven by the engine, and are then managed by one workman. The perfect sphericity of the surfaces is tested by applying the glass model, of which mention has been made above. After both the glasses have been carefully freed from dust, etc., the one is superposed upon the other. Thereupon Newton's rings make their appearance, which should be the case if the surfaces fit properly, while, with a surface of which the radius of curvature is different from that of the model, they show no color.

Very special attention is bestowed upon the centering both of the single and combination lenses. Centering in the optical sense means grinding the edge of the lens in a lathe in such a manner that it is equidistant at every point from the optic axis. To effect this the lens to be centered is cemented on to a lathe with horizontal spindle, centered by a poppet and an adjusting lever, and then turned. This, next to the attainment of a perfectly spherical surface, is the most important requisite of a good system of lenses.

Another operation of great delicacy is the manufacture of prisms, both for optical and photographic purposes. It should be remembered that the angles of the prism, which must be highly accurate if the desired effect is to be produced, must be obtained by grinding and correction. For example, the angle of a right-angled prism is only then exactly 90° when parallel rays of light falling on the two surfaces inclosing that angle are reflected parallel to one another, when the position is such that a line joining the source of light and the angle of the prism should, if produced, bisect that angle. The correction of the two 45° angles is also ascertained by construction, and likewise the so-called pyramidal error.

The firm was founded in 1855, and, besides its well-known photographic objectives, produces also telescopes of sizes up to 33 cm. object glass diameter. An instrument of this size is now in process of manufacture for the Upsala observatory, and others

have been supplied for the observatories of Potsdam and Catania.—*Deutsche Photographen Zeitung*; *Br. Jour.*

Large Tree.

The *Arlington Times* says that the largest tree in Snohomish County, Cal., probably is a cedar which stands a little way from the Kent's prairie and Stanwood road, about six miles from Arlington. A party of nine went down from that place lately to satisfy themselves of the truth of what by them were regarded as exaggerated reports of its size. The measurement taken shows it to be 68 feet, being nearly 23 feet in diameter. If measured around the roots and knotty protuberances the tree would likely measure 99 feet. The measurement was as close to the body of the tree as line could be drawn. About 75 feet from the ground the tree forks into four immense branches. Just below the forks is a big knothole, and five of the party—Jack Howard, J. F. Shannon, A. Engberg, Ralph Morris, and Harry Patterson—climbed up and made an exploration of the inside of the tree, which is a mere shell, though still green. They went down some 45 feet in the tree, and claim that there is standing room for at least 40 men there. A peculiar feature which they noticed was that the tree is barked on the inside the same as on the outside.



HANDLING A BOA CONSTRICTOR IN A SAFE AND EASY WAY.

tested, except the larger sizes of telescopes, which are subjected to the same ordeal in a passage (forty meters long) on the ground floor.

The glass used has, since that firm has been in existence, been supplied by Schott & Co., of Jena, either in the form of slabs or of pressed lenses, which latter, however, have to be carefully annealed before being dispatched from the Jena manufactory. The lenses are, first of all, roughed out in cast iron moulds by hand, and then ground fine by means of emery powder and water in glass moulds. Each workman is provided with a glass model of the surface to be imparted to the lens. It goes without saying that all the surfaces to which the lenses are ground are spherical, *i. e.*, no hyperbolic or other forms are employed. Each surface is tested to see if it has received its proper curvature by means of a so-called spherometer. The different operations of grinding, finishing, polishing, centering, etc., are all performed by separate workmen, who are practiced in one of these particular branches only. The grinding and polishing rooms are carefully separated from one another, as also the machinery employed, by which means the presence of emery powder where it is not wanted is prevented, and the scratches and injury to the lens which result therefrom are avoided.

The lenses are polished by means of rouge, in moulds

The Insolubility of Pure Metals in Acids.

The results of an investigation concerning the cause of the insolubility of pure metals in acids are contributed by Dr. Weeren to the current number of the *Berichte. De la Rive*, so long ago as the year 1830, pointed out that chemically pure zinc is almost perfectly insoluble in dilute sulphuric acid. Dr. Weeren's theory of the phenomenon is as follows: "Chemically pure zinc and also many other metals in a state of purity are insoluble or only very slightly soluble in acids, because, at the moment of their introduction into the acid, they become surrounded by an atmosphere of condensed hydrogen, which under normal circumstances effectually protects the metal from further attack on the part of the acid." The experiments from which this theory has been derived were briefly as follows: The amount of chemically pure zinc dissolved by the acid was first determined. It was next sought to determine what difference would be effected by performing the experiment *in vacuo*, when of course the escape of the hydrogen would be greatly facilitated. The solubility was found under these circumstances to be increased sevenfold. Next the experiment was performed at the boiling temperature of the dilute acid, first when ebullition was prevented by increasing the pressure, and secondly when ebullition was unhindered. In the first case, when ebullition was prevented, the solubility was practically the same as in the cold; while in the second case, with uninterrupted ebullition, the solubility was increased 24 times. Finally, experiments were made to ascertain the effect of introducing into the acid a small quantity of an oxidizing agent capable of converting the hydrogen film to water. When a little chromic acid was thus introduced the solubility was increased 175 times, and when hydrogen peroxide was employed the solubility was increased three hundredfold. The explanation of the ease with which the metal becomes attacked when

the ordinary impurities are present is that the hydrogen is not then liberated upon the surface of the zinc, but rather upon the more electro-negative impurities, leaving the pure zinc itself open to the continued attack of the acid.

Speed of Bicycles.

The *Kölnische Zeitung* gives an account of some interesting experiments which were tried by Major Brix, the commander of the Militar-Turnanstalt in Berlin, in order to test the speed of bicycles as compared with that of horses, for the purpose of conveying dispatches to Berlin and Weissensee. The distances attempted were, from Straussberg to Weissensee, a distance of just under 24 miles, and from Eberswalbe to Weissensee, 32 miles. In the latter journey two cavalry officers rode against two infantry officers mounted on bicycles. The latter accomplished the journey in 215 minutes and 210 minutes respectively, while the two lieutenants on horseback arrived at their destination seven minutes before the first bicycle rider. In the shorter distance the same result was obtained, the riders arriving a few minutes in advance of the bicyclists. In both cases the cavalry officers only rode at a gallop for the first fifteen minutes of the journey, while the bicyclists went at full speed all the way.

Progress of Cotton.

The development of the American cotton crop from 900,000 bales in 1830 to nearly 11,000,000 bales in 1890 represents a vast increase in the world's consumption of this material. Fifty years ago it would have been considered impossible that a demand for such a large supply could have come into existence; and even now, some persons are puzzled to determine how it happens that the consuming power of mankind always adjusts itself to every enlargement of the product. In a recent report, Mr. Carroll D. Wright shows that the increased

consumption is due, not so much to the fact that there are more people, as to the further fact that each person uses more material. The per capita consumption in this country in 1830 was only 5.9 pounds. In 1890 it was 19 pounds, an increase of nearly 300 per cent. In the meantime the western part of the world has become more densely populated, while Europe has for many years been almost free from the desolating and destructive wars which impoverished the people and forbade them to supply their wants. Thus while the consumers all over the world have had large means with which to buy, the wonderful improvements in machinery have reduced the cost of manufacture so that prices here have steadily fallen. The cotton mill of 1890 produces, at a given cost, a quantity of material far in excess of that produced by the cotton mill of 1830, and increasing competition continues to compel the introduction of economies which tend to force prices even to lower figures. It is safe to assert that the product will never exceed the demand.—*Textile Record.*

Patent-Combination-Reissue-Validity.

The United States Circuit Court for the Northern District of Illinois held, in the recent case of the Alaska Refrigerator Company vs. the Wisconsin Refrigerator Company *et al.*, reported in the *Legal News*, of Chicago, that in order to defeat a patent for a combination it is not enough to show that all the elements of the combination, separately considered, were old at the date of the invention, that a reissue cannot be held invalid because of enlargement of claims when the original patent is not in the case, and no evidence is offered to show expansion in the reissue beyond what is justified by the original specification and drawings, and that the presumption is in favor of the validity of a reissue applied for and obtained in less than two years after issue of the original patent.

RECENTLY PATENTED INVENTIONS.**Railway Appliances.**

BRAKE VALVE MECHANISM.—Alfred P. Riggs, Colorado City, Col. This is an auxiliary regulating valve mechanism, the invention relating to a triple valve of fluid pressure brakes, and providing improvements whereby, after the brakes are set, the pressure in the brake cylinder may be reduced to any desired amount, and the auxiliary reservoir receive at the same time an amount equal to that released from the brake cylinder. A novel spring mechanism is also provided for returning the piston to its normal position, and the drip cup has a readily removable strainer.

HANGER FOR CAR DOORS.—Peter A. Laine, Rutland, Vt. This invention provides a novel and simple means for the support of a freight car door from a hanger bar near the top of the car, permitting the door to have a laterally sliding movement. The construction is such that the door may be swung outwardly by lateral pressure, and slide in the space between the outside of the car and the inner surface of the hanger bar, or be moved opposite the door opening in the car side and be swung inwardly to allign therewith, thus sealing the opening and aligning the outer face of the door with the exterior surface of the car.

LONGITUDINAL RAILWAY SLEEPERS.—Johann P. E. C. Stromeier, Twickenham, London, England. This is a metal sleeper transversely corrugated, and the rail rests on the crests of the corrugations, to which it is attached by lugs formed by punching and stamping the metal. Wedges are driven into the hollows of the corrugations separating the crests, these wedges also supporting the base of the rail, and pressing its flanges against the under sides of the lugs.

Electrical.

SAFETY DEVICE FOR ELECTRIC WIRES.—John H. Sedlmeyer, Johnstown, Pa. This invention is designed more particularly for application to the trolley wires of electric railways, for giving an alarm at the power station when the line wire is broken or is crossed by another wire. Combined with the main line is a normally dead parallel conductor, a spring-actuated switch lever connected with the line wire, and held in engagement with its contact point by a clock mechanism, of which a detent lever forms a part, adapted for engagement with an armature lever, while an electromagnet is provided for operating the armature, and is electrically connected with the normally dead wire. The invention is also equally applicable to electric light wires.

Mechanical Appliances.

BENCH VISE.—Joseph F. Emmert, Waynesborough, Pa. Combined with the bench and a hinged sleeve adapted to be swung up from a vertical to a horizontal position, is an inner jaw held to rotate on the sleeve and an outer jaw having a bearing in the sleeve, the bearing being adapted to rotate and longitudinally adjustable in the sleeve. The improvement is more especially designed for carpenter's bench vises, providing therefor a vise which can be arranged for substantially universal adjustments, and presenting many advantages over the ordinary vises.

PLUMBERS' PORTABLE HEATER.—William A. Nicholas and Henry Birnbaum, Rapid City, South Dakota. This is a soldering iron and pot heater, and has a base on which is arranged an oil reservoir, with burners on the opposite end of the base, and a detachable hood having a hole and cover and a door. A casing surrounds the burners, there being a transverse partition in the casing and a drip pan on each side of the partition. This heater can be used indoors or out in all kinds of weather, and one or more irons and a pot may be heated at the same time.

ANTI-FRICTION COMPOSITIONS.—Jonathan Harris and George Wass, Painesville, Ohio. This invention covers a process of producing a compound suitable for bearings or wearing surfaces of different kinds, the compound being composed of a metallic base, as any quality of Babbitt metal, antimony, lead, tin, zinc, copper, or brass, with which is mechanically mixed a certain proportion of plumbago, the mixture being effected in such way that the lubricating properties of the plumbago will remain intact.

LACE HOLE CUTTER FOR BELTS.—Theodore O. Earle, Binghamton, N. Y. This is a neat, light and durable tool, especially adapted for use upon rubber belts, in which it is designed to cut a clean, clear hole, in the thickest belt, without subjecting the layers to undue strain, or disturbing their relation to each other. The body of the device is of the general shape of a C-clamp, one member of which is provided with a revolving cutter, while the other has a table portion to receive the belt, the proper position of which is readily regulated by an adjustable gauge.

VALVE FOR AUTOMATIC FIRE EXTINGUISHERS.—Edwin W. Storer, Philadelphia, Pa. This improvement is adapted for use in connection with a dry pipe automatic system, when the pipes are filled with compressed air instead of water, and connected with the water supply by a valve, the rise in temperature opening the sprinklers and actuating the valve. The valve case has a centrally movable tube with a valve at each end, and a duct having an auxiliary valve leading through the inner valve, while a lever mechanism connects the auxiliary valve with a flexible diaphragm on the outer side of the outer valve. The device is of simple and inexpensive construction and positive in operation, and the valve is held in place by a very small air pressure.

PAD PRESS.—Martin V. B. Bean, Lanesborough, Minn. This invention relates to presses used in making harness saddles, and provides a pad press designed to be easily and perfectly adjusted to the saddle back, while holding the pad in such a manner that it might be conveniently stuffed, and will have a smooth, flat, even bearing face. The base of the press has vertically slotted parallel flanges on its upper side, caps having shoulders on their under sides being mounted on the flanges, while forming plates on the base have bolts extending through slots in the base, and thumb screws extending through the flanges impinging on the forming plates, a glass plate being held between the latter and the cap shoulders. The glass is heavy enough not to be easily broken, while permitting the work to be seen. When the pad is stuffed it is held against the forming plates adjusted against the back of the saddle, and when filled exactly corresponds to the shape of the saddle. The same inventor has obtained an additional patent for clinching plates for use in connection with these pad presses, the plates being quickly adjusted and held in place within the saddle pad, so that the rivets used to fasten the pad linings together may be clinched. The plates are of thin flexible material and shaped to correspond to the pad.

Miscellaneous.

STEAM COOKER AND DISH WASHER.—Huldah A. Shepard, Nelsonville, Ohio. This is an apparatus designed to conveniently cook large quantities of food, and to be easily changed from a cooker into a dish washer. A series of perforated shelves is mounted in the body of the device, which has a removable perforated cover, and a vertically movable dasher secured to a rod is mounted beneath the shelves, the rod being operated by lever, the raising and lowering of which moves the dasher to throw soap and water over the dishes previously placed in position to be washed. For cooking, the articles are placed on the shelves, with sufficient water in the bottom of the

device, which is placed over a fire, and the cooking is effected by the steam generated.

FIRE ESCAPE.—Metrah Makely, New Berne, N. C. This device consists of a clamp adapted to grip a rope, and having handle portions by which the grip of the clamp on the rope may be regulated, in connection with a pair of presses arranged to sustain the weight of a person, whose weight will operate to tighten the clamp on the rope. The rope is passed down to the ground from a secure fastening in the upper portion of a building, and the clamp sections are made to press with a readily regulated pressure upon the rope to control the speed of descent while one is lowering himself to the ground thereby.

FEED BAG RAISER.—George B. Schmidt, New York City. This is a tension device capable of attachment to any feed bag, and so made that the bag will be lifted in proportion to the amount of feed taken from it, so that the animal feeding can at all times readily reach the food. One of the devices is connected with each side of the bag, and the two devices are united by a rope or strap attached to eyes of the yoke, and sustaining the bag from the animal's neck. The improvement not only prevents tossing of the head to get at the feed, but prevents waste of oats, wear and tear of the bag, and the necessity of tying the rope when putting on the bag. The breathing of the horse cannot be interfered with, and he cannot slide the bag on the ground.

BOW FACING OAR.—George R. Merrell, Boston, Ill. Combined with a pivoted bracket and an oar capable of a rocking movement therein is a handle having a link connection with the bracket, while a gravity arm is rigidly attached to the inner end of the oar, and a projection on the upper face of the link connection is adapted for engagement with the gravity arm. The ore is automatically feathered upon its return stroke, and the bracket has two apertures, through either of which it may be pivoted upon the face plate, which is a rocking plate, the outboard aperture giving double inboard leverage over that obtained when the fulcrum is at the inboard aperture.

FRUIT CLIPPER.—Ripley A. Stewart, Leesburg, Fla. This is a device to be held on the hand by loops over the thumb and forefinger, and by a wrist strap, the shear blades being connected by a rivet or screw, which also holds a guard plate. The shear blades have double flanges to receive the thumb and forefinger, and the stem is supported during the cutting operation by the guard.

HOSE COUPLING.—William L. Johnson, Pomona, Cal. In front of one end of the coupling is a latch consisting of a bail, with rearwardly and downwardly extending arms pivoted to the coupling, and semicircular recesses at the junction of the arm with the bail, while a spring-controlled yoke, to which is connected a lifting device, is pivoted to the rear portion of the bail, a lock on the coupling forming a stop for the yoke and holding the bail in locked position. It is a simple device for forming a quick, firm, and close connection with an opposed coupling.

WATCH CASE HINGE.—George Newton, New York City. This invention relates to an improvement in cap joints of cap-winding watches, and provides for strengthening the connection of the pulling knuckles with the joint and cap at the point of attachment of the knuckles with the joint and cap, or dome. A great source of trouble heretofore experienced in this class of watches has been the breakage of the hinge, which is very frail and liable to be torn away from the cap or dome from the extra friction of winding imposed on the cap, a trouble which this improvement is designed to obviate.

WATCH BALANCE STAFF.—James E. Swarthout, Elmira, N. Y. This staff is exteriorly threaded, and the balance wheel has an opening in its

arms of greater diameter than the staff, on which screws a collar adapted to singly fit in the opening of the balance wheel, while locking sleeves are also screwed on the staff, one above and the other below the wheel, the sleeves having recesses in their inner faces. The improvement provides for the ready removal of the staff when desired, and for the convenient adjustment of the balance wheel up or down, without interfering with its true horizontal alignment.

COIN OPERATED SALES MACHINE.—Alphons Brau, Amberg, Germany. This machine is designed to automatically deliver postage stamps and postal cards, railway tickets, etc., on the insertion of a definite coin in a particular opening provided for the purpose. A hollow lever is pivoted to rock in the casing of the machine, and there is a slotted coin-receiving drum on the outer end of the lever, a spring-cushioned rod sliding in the lever having pronged plates to engage the coins, while an angular spring-pressed lever is pivoted in the path of the rod and a goods-carrying plate slides in the path of this lever and has projections engaged by it.

JOIST OR BEAM BRACE.—William Paine, Sr., Brainerd, Minn. This is a bridging for joists, consisting of a zigzag bar or rod of iron provided with seats adapted to receive and clip over the upper and lower faces of joists or beams, one section being apertured and the other slotted to receive a bolt, by which the sections are adjustably held together. Simple and inexpensive braces and supports are thus formed to tie or hold the beams or joists on which the floor of a structure is laid, distributing the weight evenly upon all the joists.

MANHOLES OF SUBWAYS.—Charles W. Hays, New York City. This invention covers an improvement designed to obviate the danger and inconvenience arising from the filling of manholes with gas, whereby explosions sometimes occur, or from their collecting water to freeze in cold weather. For this purpose a removable box is provided, of a size to nearly fill the manhole, the box having suitable handles whereby it may be readily raised, and a nozzle and vent opening through the top, the latter being usually plugged. The box will so nearly fill the opening as to prevent the accumulation of large quantity of gas, and if water should become frozen in the manhole, the ice may be readily thawed by introducing steam into the box through the nozzle.

DISINFECTANT HOLDER.—Edward A. McCartney, New York City. This is a device to be applied to water closets, sinks, etc., to give off a disinfectant at every flush of the closet, to unite with the water in washing down the surface of the bowl. The holder is supported in the bowl by a rod, and is preferably cylindrical in shape, its entire surface, as well as the head and screw cap, being perforated, so that the water used in flushing will come in contact with the disinfecting material through the perforations. The disinfecting agent is to be made in shape to correspond with the bore of the holder, being compounded of substances that will retain the desired shape after being moulded.

THILL COUPLING.—Anton Niekamp, Maria Stein, Ohio. In this device the clip is integral with a hollow body having a slot in its upper face and an opening in its front face, the thill having a head adapted to enter the chamber of the body, the slot in which is closed by a lock bar above the head, while a sleeve on the thill iron engages the body and locks the devices. The coupling is an anti-rattling one, employing neither springs nor rubbers, and the fastening devices are readily loosened and tightened by hand, dispensing with the necessity of a wrench.

WINDOW CLEANING CHAIR.—Abner Barnhart, Brooklyn, N. Y. This chair has a body section to which guard rails are pivotally attached, brace beams having a sliding connection with the rear end of