

NEW YORK ACADEMY OF SCIENCES.

The regular business meeting of the Academy was to have been held on Monday evening, April 2, but owing to the storm a quorum was not present and no business could be transacted. Professor Chas. A. Seeley continued his paper of the previous meeting on devices for securing pressure in filtration; after which Professor G. J. Rockwell, of the Japan University, presented a paper entitled

INDEX TO THE LITERATURE OF VANADIUM, 1801 to 1877, which was read by title, and will be published in full in the *Annals of the Academy*. This index is on the same plan as those on uranium and manganese, by Dr. H. C. Bolton, and on titanium, by E. G. Hallock, previously presented to the Society. Vanadium has recently been discovered to be one of the most useful metals, especially for the manufacture of aniline black and indelible ink. As yet the sources are few, and the amount found very minute; so that the metal sells for \$330 per ounce. Some of our New Jersey ores, however, says Dr. J. Walz, contain vanadium, and the Yankee who succeeds in extracting it on a commercial scale will confer a lasting benefit and secure a fortune at the same time. Mr. Rockwell has given in his index some 500 references, which will enable the investigator to find out with but little labor just what has already been known and written.

The Section of Chemistry held their regular meeting Monday evening, April 9, at the School of Mines, Columbia College. The first paper of the evening was by Mr. T. O'Connor Sloane, E.M., on the

EXPERIMENTAL EXAMINATION OF GAS COAL.

The speaker, who is a practical gas engineer, first described the methods of making illuminating gas from coal by dry distillation on a large scale. The subject was suitably illustrated by lantern pictures. The wet and dry meters were also exhibited, and their action explained. Mr. Sloane then described the experimental gas apparatus employed by him for determining the quantity and quality of gas that may be obtained from a given specimen of coal. The retort employed is 7 feet 4 inches long, and will hold a charge of 224 lbs. of coal. The stand pipe is 7 inches in diameter; beyond the main, the hydraulic main 3 and 4 inch pipes may be used. The usual forms of condenser, scrubber, purifier, and meter are employed. The gasholder, which has a capacity of 15,000 cubic feet, is so arranged that, when the holder is down, it will be entirely empty. It is weighed by running water into a basin formed by the top sides of the holder. By-passes are used to cut out any of the purifiers or meter if desired. Gas from the large works can also be sent through this apparatus for experiments with the condensers and purifiers. A preliminary charge is made at 7 A.M., to get all the old gas or air out of the apparatus, and is drawn at 10 or 11 A.M., when 1,100 cubic feet of gas have been run through and registered. The next charge is carefully weighed and put in, the meter reading taken, and the apparatus connected with the holder. About 5 P.M., when the gas comes off so slowly that it requires two to three minutes to make a foot of gas, the charge is drawn. Two determinations are usually made: one of maximum yield, the other of quality at standard yield. The coke is also weighed at the close of the operations. The gas ought then to be subjected to a careful and complete analysis, which is not done in any of our city gasworks, probably owing to the labor and expense, which influences the penny-wise, pound-foolish action of the directors.

The second paper of the evening was on the

DETERMINATION OF IODINE BY THE BLOWPIPE,

by Mr. Walter B. Devereux. The determination of iodine in the presence of the other halogens, chlorine and bromine, has hitherto been a difficult and uncertain operation in blowpipe analysis. Mr. Devereux takes advantage of the well known property which sulphate of copper possesses, of decomposing metallic iodides and liberating the iodine. The substance to be tested is mixed with one third its weight of pulverized sulphate of copper, and the mixture is introduced into a glass tube closed at one end and heated. The iodine is easily recognized by the violet color of its vapor, or by holding a piece of moistened starch paper at the open end of the tube, taking care that the paper does not become heated, which would destroy the blue color of the iodide of starch. This precaution is more especially necessary in the case of iodide of silver, which requires a high heat for its decomposition. At the close of Mr. Devereux's remarks, Professor Egleston spoke of the great value of this test, and expressed the hope that equally simple tests might be found for chlorine and bromine when mixed together.

The third paper for the evening, by Dr. P. de P. Ricketts, was on the

REFINING AND COINING OF GOLD AND SILVER.

Dr. Ricketts illustrated his remarks by a series of magic lantern views, showing the apparatus and machinery employed in the Government assay offices and mints. The treatment of the crude bullion with nitric and sulphuric acids was described, and the method of assaying the same referred to. The alloying of the fine bars from the parting for the manufacture of coins was explained; and the various operations of rolling, annealing, culling, milling, and cleaning the coin dies, also the stamping and adjusting of the coins, were shown by views taken from the mint in Philadelphia. The method of making the steel dies for coining and the apparatus for utilizing the waste of the mints and Assay Office was illustrated and explained, some reference being made to the European mints.

Binocular Vision Experiments.

BY FRANCIS E. NIPHER.

It is possible that the phenomena here described may have been observed before, but I have been unable to find any record of them.

1. Fold a sheet of writing paper into a tube about an inch in diameter. Look through the tube at some distant object with one eye, and toward the open end with the other eye, the edge of the hand being in contact with the tube. The dissimilar objects producing unlike images upon the retinae, the sensations blend, and a hole will appear to be cut through the palm of the hand, through which the tube passes. That part of the tube between the eye and hand will appear to be transparent, as though the hand were seen through it.

This experiment is very old, but seems not to have found its way into scientific literature.

2. Replace the hand by a sheet of unruled paper, upon which a drop of ink has been placed. By proper management, the ink blot may be made to appear within the tube, by so placing the paper that the hole, which is apparently cut through it, coincides with the blot. Ordinarily the blot will then appear opaque, the paper immediately around it, and apparently within the tube, being invisible. The blot appears as it were suspended in space. By concentrating the attention strongly on objects seen through the tube, especially if they are strongly illuminated, the blot becomes more hazy, transparent, and may even be made to disappear altogether. The mental effort necessary to do this cannot be maintained more than a few seconds, and the spot will reappear. If the effort to cause the spot to thus disappear be kept up, the attention being strained to its highest pitch, the blot will disappear and reappear at regular intervals of a few seconds, the absolute time depending upon the illumination. It seems as though the organs exerted become fatigued, and, relaxing for a few moments, refreshment sets in, which again renders possible the exertion necessary in causing the blot to disappear. It is possible that these experiments may be so made as to throw some light upon the conditions necessary in fixing the attention. Interesting experiments may also be made by substituting a fragment of a plane mirror for the sheet of paper. Looking through a rather large tube at a distant object with the right eye, the reflected image of the left eye will appear staring up the tube, the adjoining parts of the head being invisible.

3. Substituting for the ink blot a small hole cut through the paper, the small hole can also be made to appear within the tube, distinguishing itself by its different illumination, the surrounding paper being invisible, unless attention be directed too strongly to the paper in which the hole is cut. The relative illumination of the small hole, and the space immediately around it, depends upon the relative illumination of objects upon which the tube is directed, and that of the sheet of paper exposed to the other eye.

4. Keeping the same arrangement, place at a distance of one foot from the end of the tube a sheet of paper so that objects beyond it are still visible; arrange matters so that it is visible to the eye looking through the tube, but not to the other, directed at the small hole in the paper sheet. This second sheet will now appear to be traversed by a hole the same in size as that cut through sheet No. 1.

Cutting a small hole in sheet No. 2, matters are easily arranged so that it appears within the hole which was before seen within the tube. These experiments may be utilized in showing the simultaneous accommodation of the two eyes.

5. Tubes of this kind, blackened on the inside, are very convenient in studying color sensations. Using two such tubes, look through one with the right eye, say, at red, through the other with the left eye at green paper, illuminated by the direct solar ray. The color sensations fade with marvelous quickness. Transferring both eyes to either color, say red, the eye fatigued by green sees the red greatly intensified, the effect being rendered the more striking by the simultaneous impressions received by the two eyes. Experiments in the combination of color sensations will readily suggest themselves.—*American Journal of Science*.

American Industry.

A public dinner was recently given in Cincinnati to the Hon. A. T. Goshorn, Director-General of our late Centennial Exhibition. In response to the toast, "American Industry," Mr. Goshorn made an interesting speech, from which we extract as follows:

"There is loud and bitter complaint that the American people are too industrious—do not have enough holidays, and burn candles at both ends, wasting adipose tissue and the precious phosphorus of the brain. A young man hardly gets fairly into business, and learns to love it and make it go, when he is set upon by wise physicians and told that he is toiling too much, and especially enjoined not to overwork the brain. Distinguished strangers mourn over us because we are lean, and say we do not chew our food because we have not time, and that temperance fanaticism runs riot in the land until generous liquors are unpopular, and we are washed pale and cold with floods of ice water. Still, from time to time, there are to be seen in public resorts American citizens who do not overwork themselves. The heavy sitting around corner groceries, drug stores, cigar shops, and beer halls is, I think, sufficient to secure the safety of the country. Then a wire-edged person might say that this visible inertia is the surface indication of the industry of those who get their living out of politics, and so save us all.

"The new world of geography is the old world of geology. There is in our valleys and mountains written proof that

some of the six days the Lord spent in making the earth must have been measured on old-fashioned timepieces, not used in the historic period. Our illustrious ancestors in crossing the Atlantic were no doubt animated by the noble purpose of having a good time. Their medical advisers told them they wanted a change of air, and that they musn't work too much with their brains. Life was heavy in Europe. There wasn't such a Paris then as there is now. This continent contained the fatness of the ages in its soil. Virginia was a vast park filled with the red deer. The rivers were flush with fish, the air was full of canvas-backed ducks and honey bees, the bays were paved with oysters, the soft-shelled crabs tickled the seaweed, and the point clams bored the sands, while the diamond-backed terrapin ambled away over the soft meadows. The fragrant sassafras tree gave its buds and roots to make tea delicious as the beverage of the Celestials—and in the deep woods were autumnal rains of nuts on the tinted leaves—walnuts, hickory nuts, beech nuts, and butter-nuts—and the pawpaws and persimmons, richer than Spanish figs, grew mellow and yellow in the white frosts, and fattened the succulent opossum—a providential preparation to soften the asperities of life for the approaching African. Talk of the hardships of the pioneers! They had a variety of sea food and forest game that would have confounded the old Romans. They lived on the cream of the universe, and licked it up to the utmost of their highly cultivated capacity.

"I do not feel that we have occasion to be always astonished at what has been accomplished, when we consider the fine continent we had herein the aboriginal package, and the endowment in capital and labor that Europe has bestowed. Let us learn to look upon the world with the understanding that the American citizen is not a being whose mission is the astonishment of the rest of mankind. The fact is, we may land at any of the European ports and stand in square-toed American boots without imparting an additional vibration to the tottering thrones.

"It is the better part of the experience of travel to be pleasantly surprised on coming home. When first contemplating America from the European standpoint, it is interesting to be asked whether you are from North or South America. They do know there are two Americas, even where they do not know the difference between Kentucky and Kansas. Returning from Europe in 1870, after attempting to identify myself in the foreign mind with North America, the popular inquiry in Cincinnati was: 'Have you seen the great Exposition?' Of course I must have seen it, wherever it was or whatever it was! The mood in which one returns from abroad is not that of being sensitive to home-made spectacles.

"When a journalist in a city of the first class, containing less than four million inhabitants, longs for the unattainable, it is likely to take in his mind's eye the form of a copy of the *London Times*. It is the expression of the highest public opinion, and therefore the best authority in England. The leading article of the *Times* of March 1 is a discussion of the importance of the representation of England at the Paris Exposition. It speaks of the superiority of the trained intelligence of the workmen of Germany and America—and so 'the competition at Philadelphia was not altogether satisfactory to us.' The fineness of the mechanical work shown at Philadelphia 'could not have been exceeded if every man who had any share in its production had originally conceived it and had been solely interested in its success.'

"It is important, then, that American industry shall be represented in Paris, so as to confirm the marvelous reputation won at Philadelphia. The fame of our Exhibition should be justified and made brilliant in the polite capital of the world. We should be represented at our best. Goshorn would be a good man, but he is from Ohio. The fact that the President, Chief Justice, General, and Lieutenant-General of the United States are from Ohio, and that their predecessors in those offices were Ohioans, seems to the country at large a shade too much for one State. We are modest: we have the 'reserve,' though Mr. Evarts cannot see it; but what can we do? True, we must draw the line somewhere on our embarrassing superabundance of talent.

"The Thunderer of London is right. There are brains in American industry. Why, the great Corliss engine at the Centennial Exhibition had brains, for I saw it pick up its own valves and drop them when there was just steam enough on, and very few men can be trusted to do that. It had so much sense it would not waste 1 lb. of steam, for it knew that steam cost money. American brains shine in the finish and fitness of the work that is commanding even the markets of Asia. It is the busy brain behind the cunning hand that guides the great artisan to perfect his workmanship, just as the colors of the artist must be mixed with brains if they are to be radiant for ever. And yet American industry has been struggling under the disadvantage arising from political disturbances and financial disorder. We must endeavor to remove our professional politics from the pathway of intelligent industry. There is a chance for strokes of statesmanship.

"One virtue in which the Americans are not conspicuous, they need to complete the round of their triumphs. It is thrift. The growth of two blades of grass or two stalks of grain where there was one should be celebrated. Cutting down trees was the beginning of our industry. The time has come to plant trees, and to cover the fields with clover to bind up the wounds of the soil—to restore to the fire-swept deserts the blooming wilderness, tempting the gentle rains from heaven that the waste places may be fruitful, that the rivers may not run turbid with the riches of the earth to the seas, and that the great continent we inherit may be good for the generations to come."

Inventions Patented in England by Americans.

From March 26 to March 29, 1877, inclusive.

ANIMAL TRAP.—J. Martin, Palestine, Texas.
BRUSH.—H. Rosenthal, New York city.
FRICTION COUPLING.—T. A. Weston, Stamford, Conn.
FURNACE, ETC.—R. L. Walker, Boston, Mass.
HORSESHOE MACHINE.—J. A. Burden, Troy, N. Y.
KNITTING MACHINE.—W. H. Abel, Laconia, N. H.
LAMP.—L. H. Olmsted, Brooklyn, N. Y.
MAKING STEEL, ETC.—C. M. Nes, York, Pa.
RATCHET CLUTCH.—T. A. Weston, Stamford, Conn.
REFRIGERATOR, ETC.—J. Tiffany et al., Chicago, Ill.
SCREW-LIFTING JACK.—J. O. Joyce, Dayton, Ohio.
STOVE.—J. K. Dimmick et al., Cincinnati, Ohio.
VEHICLE WHEEL.—J. B. Sammis et al., New York city.
WHEEL SKATE.—C. W. Saladee, Wolcottville, Conn.

Recent American and Foreign Patents.

NEW MISCELLANEOUS INVENTIONS.

IMPROVED CARD RACK.

James P. Lamoree, Canandaigua, N. Y.—This card rack is formed of a series of clamping strips or slats, connected in step shape at their thicker ends, so that the thinner spring ends extend one beyond the other, and form spaces for the storing of the cards.

IMPROVED CHECK-REIN SPREAD AND ATTACHMENT.

Daniel Schoonmaker, Newark, N. J.—This consists of a rein-spread formed in one piece, of cast metal, which is attached to the ends of the check-rein straps, or is provided with loops running transversely to its body, in which case the strap may be continuous from one end of the bit to the other, simply passing through the loop of the spread. The spread is of such form as to be readily placed on, or removed from, the water-hook. The device further consists in a bolt having a head of peculiar form, to be applied to the saddle, to be used in place of the usual water-hook, in connection with the rein-spread.

IMPROVED ADJUSTABLE HAT.

I. Ygnacio Cassiano, San Antonio, Tex.—The present invention is an improvement upon a former patent granted to same inventor December 2, 1873; and the object of the same is to furnish sectional bands for hats, so constructed as to leave the forehead of the wearer free, and so that the band may be adjusted to a larger or smaller head, and to fit closer or looser, as may be required, or, if desired, to cover the whole or part of the forehead.

IMPROVED THILL COUPLING.

Thomas B. Farrell and Martin D. Borst, Cobleskill, N. Y.—This consists of a fork or yoke for receiving the thill irons, that fits into a socket attached to the axle by means of a clip. The said fork is provided with a rubber spring, that presses against the thill iron, and abuts upon a plate that rests against the socket. A nut is provided at the rear end of the fork, for drawing it into the socket and tightening the rubber spring.

IMPROVED SHACKLE FOR CONVICTS.

Jay L. Quackenbush, Portland, Oregon.—This invention consists in the combination of hidden screws with the semi-cylindrical jaws of the half-ring parts of the shackle, having a screw thread cut upon their outer surface, and caps having a screw thread cut upon their inner surface. The key may be made with a fork to enter holes in the heads of the screws.

IMPROVED BALE TIE.

Joseph H. Fisher, Chicago, Ill.—This consists in a buckle of peculiar construction, adapted to a metallic strap to which it is attached. A lever engages projections on the sides of the said buckle, and there is a hooked pawl for engaging holes in the bale band.

IMPROVED PHOTOGRAPHIC PLATE HOLDER.

Charles L. Kempf, Brooklyn, N. Y.—This is an improved holder for photographic plates, so constructed as to enable the solution to be saved, and at the same time to protect the said frame from being destroyed by the solution. The double reversible corners are provided with a rabbet along their inclined edges, a groove along their lower flange, and other arrangements to adapt them to receive and carry off the solution. Tubes pass through the angles, and there is a curved solution bottle, provided with a mouth at each end, in combination with the recessed bottom bar of the frame, and with the two corners.

IMPROVED FIRE ESCAPE.

Tobias Lyness and Joseph P. Dunne, New York city.—This consists of a crosspiece with spurred end cheeks, placed across the inside of a window casing, and having a rope ladder suspended from adjustable eyes. The rounds of the rope ladder are provided at the ends with brackets, and that part of the ladder which passes over the lower window is arranged with one or more crosspieces in place of the brackets. In case of fire, the main crosspiece is placed across the window casing, and the rope ladder, with the lower crosspieces, lowered from the window, after which the fire escape is ready for use.

IMPROVED CARTRIDGE-LOADING IMPLEMENT.

James H. Dudley, Poughkeepsie, N. Y.—This instrument may be used as a rammer for loading, capping, removing an exploded cap, or for withdrawing a cartridge shell from a gun barrel, or the paper cylinder of a cartridge from a gun barrel should the metallic base-piece pull off. It may also be used for grooving a cartridge shell to prevent the charge from dropping out.

IMPROVED THILL COUPLING.

James F. Hill, Fleetwood, Pa.—This is an improved thill coupling, by which the shafts may be readily shifted from one carriage to another. The invention consists of a shaft box or bearing, with hinged top attached by a clip to the axle. The center pin of the shaft attachment turns in the box, and is retained therein by a locking lever mechanism, that binds on a tongue of the cap.

IMPROVED BAG FASTENER.

Henry Redden, New York city, assignor to Andrew M. Underhill, of same place.—The object of this invention is to improve the construction of the bag for which letters patent were granted to same inventor May 23, 1876, in such a way that its contents may be discharged readily and quickly, and which, when tied, will prevent any leakage. When the bag has been filled, the outer edges of two flaps are brought together, and the said flaps are rolled together within the mouth of the bag. The mouth of the bag is then drawn together over the flaps by cords. The apron is fastened on the inside near inner edge of hem, while the cord runs parallel to the hem, to allow the bag to be fastened quickly without sewing, and opened without cutting.

IMPROVED CHAIR SEAT AND BACK.

Paul Rath, New York city.—The bottom of this chair seat is made preferably of a piece of pasteboard which is stamped by suitable machinery, so as to form a central opening; and a concave moulding, of suitable depth, extending around the opening. The sides of the pasteboard are turned down to form flanges by which the seat or back may be attached to the piece of furniture. The pasteboard is covered at both sides with canvas or other fabric, that passes across the center opening, so as to close the same and provide a flexible base for the seat. When the bottom is thus finished it is exposed, with a quantity of wadding or other stuffing, and with a loose leather or other covering, to the pressure of a powerful hydraulic or other press, by which the bulk of the wadding is reduced to smaller compass, and sufficient elasticity given to the same to furnish a soft and flexible seat.

IMPROVED NECKTIE.

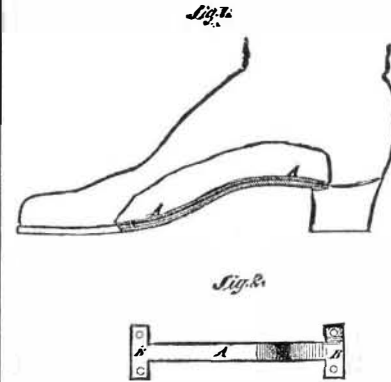
Robert Swenarton, Newtown, N. Y.—This consists of a slotted plate for receiving the collar button, which is provided with a barb or projecting point at each side for engaging the ends of the band that encircles the neck. The object of this invention is to provide a necktie that may be securely fastened, so that it cannot become accidentally loosened, and which is capable of being worn either with or without a band to encircle the neck.

IMPROVED BUCKLE.

Benjamin F. Melton, Gainesville, Tex.—This consists of a buckle with fixed loop extending at the under side from the lateral tongue bar of the buckle. It may be manufactured quicker and cheaper than when the loop has to be sewed with the buckle to the strap end.

IMPROVED SHANK SUPPORT FOR BOOTS AND SHOES.

George W. Wells, Black Hawk, Col.—The invention illustrated herewith is an improved spring for the soles of boots and shoes, so constructed as to prevent the soles from twisting or getting otherwise out of shape, while



giving great elasticity. A is the spring, which is made of steel, and of such a length as to extend from the heel to, or nearly to, the ball of the foot, and which is bent to give the desired arch to the sole. The spring, A, is made with a cross-head, B, at each end, as shown in Fig. 2. Through the ends of the cross-heads, B, are formed holes, to receive rivets for securing the said spring to the insole of the boot or shoe. The rivets have wide flat

heads, to give them a firm hold upon the insole, and prevent them from hurting the feet of the wearer. This construction gives the springs great strength to recover themselves from a lateral twist or strain, and at the same time gives to the sole elasticity in walking. The inventor, who may be addressed as above, desires to contract for the manufacture of this device.

IMPROVED MODE OF EXTINGUISHING FIRE, ETC.

Donald McLennan, West Green, assignor of one half his right to Mary Ann Davis, London, England.—This is an improvement in means for extinguishing fires by discharging water from stationary perforated tubes attached to the walls or ceilings of rooms, halls, etc., of buildings. The improvement relates particularly to the construction and arrangement of devices for turning on and shutting off water in the several rooms in which the perforated tubes are located. Each cock is operated by a connecting rod, elbow lever, and a pull rod. The several pull rods are arranged together, and extend downward by the side of the wall of the building, and are provided with suitable handles. By pulling any one or more of the rods, the water will be let on in the corresponding room or rooms.

IMPROVED TRUNK CATCH.

Eliakim Rice, Cazenovia, N. Y.—This consists of a trunk catch made of three castings, provided with a spring, and capable of being put together without special fitting. It is so constructed that two dowels cast on the portion attached to the cover enter sockets formed in the part attached to the body of the trunk. The whole is arranged so that the parts may engage automatically, and may be readily disengaged.

IMPROVED SMOKING PIPE.

Bengt A. Jonasson, Warren, Pa.—This is a folding smoking pipe whose joint consists of two rabbeted hollow half-spheres and an opening spring retainer. With this construction the mouthpiece can be turned down beneath the base, and the pipe thus reduced to small compass.

IMPROVED WIRE FENCE.

Charles D. Johnson and Levi F. Johnston, Marshalltown, Iowa.—The post is made semi-circular in cross section, and slotted to adapt it for attachment of staples for supporting the wires. This form of post secures the desired combination of strength, lightness, and cheapness. The staples are formed of short lengths of wire whose ends are twisted together and project from the post, thus forming barbs which prevent cattle rubbing against the post.

NEW WOODWORKING AND HOUSE AND CARRIAGE BUILDING INVENTIONS.

IMPROVED DUMPING WAGON.

Robert A. Reed, Hoboken, N. J.—This is an improved device for attachment to the frames or bodies of trucks, wagons, cars, etc., to facilitate their loading and unloading. The general construction is such that by operating a lever the forward end of the load is raised, so that it will readily slide off. When the load is arranged to be carried, swiveled crank screws are turned to force a crossbar down upon the load, and thus bind it in place.

IMPROVED SASH BALANCE.

Adam Kolb and Charles Osberghaus, Sandusky, O.—This invention consists in combining, with pulleys, cord, and spring clutch, a rod pivoted to the clutch, and passing through a hole in the casting. The operation is as follows: When the bolt is withdrawn the lower sash may be moved upward, when the upper sash will move downward, the two sashes counterbalancing each other. If it is desired to lower the upper sash without raising the lower one, the free end of the connecting cord is drawn outward, thus drawing the clutch away from the cord by means of a rod. The cord is, at the same time, permitted to pass through an eye and between the pulleys, allowing the sash to drop.

IMPROVED SASH FASTENER.

Henry Jones, East Saginaw, Mich.—This consists of a bearing piece, supported in a casting mortised into the window sash, and which is made to press with more or less force against the casing, according to the weight of the sash, by an adjustable volute spring. The device is capable of being locked by turning a button against the bearing piece when it has dropped into a notch provided in the casing for that purpose.

IMPROVED SKY-LIGHT BAR.

Joseph Henry, Chicago, Ill., assignor to himself and R. Philip Gormully, of same place.—This consists of a sky-light bar formed with two gutters and two glass supports at both sides of the double center part, to which the cap is connected by flat bolts and fastening cross bolts or rivets. The glass supports are concaved for receiving the putty, while the double gutter forms an interior gutter for any leak-moisture of the bolts.

NEW MECHANICAL AND ENGINEERING INVENTIONS.

IMPROVED WINDMILL.

Elias Stata, Cape Vincent, N. Y., assignor to Mary E. Stata, of same place.—This consists in the combination of a hoop or shield and a governor with a vertical windmill, in such a way that the action of the governor applies a portion of the power of the mill to raise the said shield, exposing more or less of the wheel to the action of the wind, thus controlling its motion.

IMPROVED SPIKE EXTRACTOR.

John A. Powell, California, Pa., assignor to himself and Jos. B. Crowthers, of same place.—This machine pulls the spikes without bending them, and is so constructed as to allow the operator to always stand within the track, so that the instrument can be used in cuts and tunnels. The arms of a clamp are pivoted to each other in such a position that their jaws may be opened enough to receive and grasp the head of a spike, which is then drawn by bearing down upon the free end of a lever.

IMPROVED CAR COUPLING.

George W. Gomer, Sybertsville, Pa.—This coupling enables the cars to be coupled and uncoupled from their tops or sides, and have sufficient play to prevent binding when the cars pass around curves. By operating a lever to press a rod downward, bars will be pressed against the inner end of the link so as to raise the outer end of said link and drop it over the hook of the adjacent car. In the same way the link may be raised to uncouple the cars.

IMPROVED CAKE MACHINE.

Daniel M. Holmes, New York city, assignor to J. Cutler Fuller, Orange, N. J., and Martha G. Holmes, New York city.—The object of this invention is to improve the construction of the machine for making cakes—such as jumbles, kisses, drops, macarons, etc.—of soft dough, for which letters patent were issued to same inventor February 29, 1876. The invention consists in the combination of movable plungers with the hollow cutters, the cutter plate, and the dough box of a cake machine. The plungers serve to cut out the dough in suitable shapes. The machine contains considerable mechanism both novel and ingenious.

IMPROVED ROD COUPLING.

William C. McClintock, Hooperston, Ill., assignor to himself and William B. Steele, Bernhart's Mills, Pa.—This consists in a rod or shaft having scarfed ends, upon which are formed alternate transverse recesses and projections, which are so proportioned that the projections of one section of shaft fit the recesses in the adjacent section. The adjoining ends of the sections are held together by a sliding sleeve, which is retained in place by a spring latch. The device is applicable to pumpsucker rods, and to shafts.

IMPROVED LIFTING JACK.

Abram R. Hurst, Mechanicsburg, Pa.—This invention relates to an improvement in lifting jacks designed with a view to simplicity, ease of adjustment, and compactness of folding; and it consists in a stationary standard having a lift bar provided with laterally projecting teeth or pins, and arranged in guides or keepers to slide longitudinally upon the standard, in combination with a lever pivoted to the standard and having an oblong or elliptical camhead which is provided with a laterally projecting flange adapted to engage with the teeth of the lift bar to elevate the same, or to be disengaged therefrom.

IMPROVED DEVICE FOR THROWING BELTS ON PULLEYS.

Robert Reinhard, Langendreer, Prussia.—The object of this invention is to provide a simple, cheap, and efficient device for applying broad or tightly stretched bands or belts to pulleys, and thereby avoiding the difficulty and danger incident to such operation when effected by hand in the usual way. The device consists of a spring clamp for holding the belt, and a screw clamp for attaching it to a pulley. The spring clamp projects radially at one side of the pulley rim, and the screw clamp is applied directly to one of the pulley spokes.

IMPROVED WATER ELEVATOR.

Christian E. Lykke, Grand Island, Neb.—This improvement relates particularly to the form of the buckets, the construction of the chain whereby alternate links may be readily detached or separated to facilitate the attachment and removal of the buckets; also to the provision of fixed rollers journaled in a frame set in the well and serving to keep the chain distended; also to the use of a weighted stand or platform placed in the well to hold the chain taut.

IMPROVED DEVICE FOR BALANCING FLYWHEELS, PULLEYS, ETC.

Charles Seymour, Defiance, O.—The pulley to be balanced is supported horizontally upon a vertical spindle having a yoke provided with arms which engage the spokes of the pulley, so that when the spindle is rotated the pulley partakes of its motion and assumes an inclination to the horizon corresponding to the extent to which one side overweighs the other. Weights are then attached to the lighter side to make the pulley assume a horizontal position.

NEW AGRICULTURAL INVENTIONS.

IMPROVED HOG TRAP.

Elijah K. Jenkins, Elkhorn Grove, Ill.—This is an improved trap for catching and holding hogs while ringing, castrating, and marking them; and the invention consists in the combination of hinged doors, connecting bars, spring, swinging gate, bent lever, and strap with the pen. In using the trap, the hogs, one at a time, are driven into the open rear end of the pen, and, seeking to pass through it, they push back the doors by forcing their heads through between them, which doors immediately close behind their ears, so that they cannot withdraw their heads, while the gate prevents them from passing any further, and they are thus held securely.

IMPROVED COCKLE SEPARATOR.

Hermann Kurth, Milwaukee, Wis.—This machine belongs to that class of separators in which a revolving cylinder, having indented inner cavities, is made to catch the small impurities, such as cockle, foreign seed, dirt, etc., and to deliver them to a trough or pan which separates and carries them out of the cylinder apart from the clean grain. The main features of the improvement consist: First, in locating above the main indented cylinder one or more indented cylinders whose cavities or indentations are larger than those of the lower cylinder, the same being designed to separate the large wheat from the small wheat and impurities, and to take the place of sieves ordinarily employed for this purpose. Secondly, in constructing the cylinder with both indentations or cavities and perforations, which perforations are separate from and independent of the cavities and serve to effect the preliminary separation of the fine seed and dirt. Thirdly, in arranging the cylinders with one end free from, and the other end attached to, the central shaft, so as to work a conveyer and deliver cockle, etc., at opposite end of the cylinder from clean grain. Fourthly, improved construction of catch board, made automatically adjustable through hinges and provided with an adjustable flexible strip for removing cockle and impurities from cavities of cylinder and delivering them to trough. Fifthly, in the improved arrangement of the metal of the cylinder in forming the cavity, designed to increase the durability of the said cylinder.

IMPROVED GRAIN BINDER.

Harvey Hull, West Exeter, N. Y.—This is a novel construction of grain binder, belonging to that class in which the sheaf is bound with a cord which is tied in a single bow knot. It consists generally in a set of pincers which, in tying the knot, operate somewhat after the manner of the human fingers. Prominent among its novel features is an arrangement for looping and holding the cord around the tying pincers in such a manner that the loop will not slip off while the knot is being tied, but will slip off after the knot is tied; the leading device being a spring catch which, operating simultaneously with the tying pincers, projects laterally from the pincers outside of the loop while the loop is being formed, but which recedes when the pincers close, to pull the cord through the loop, and thus permits the loop to slip off. Among other important features, also, is a spring arm for holding the cord while the knot is being tied, and a hook for drawing the knot well down to the bundle.