

smooth cast iron pulley. He said that the old rule, "that the number of inches in contact, multiplied by one half the velocity of the belt in feet per minute, and divided by 33,000, would give the horse power," might give it once in a hundred times, but not oftener. The rule is that a belt holds upon a pulley as the tension (pressure) and as the square of the degrees of wrap. A belt wrapped one quarter around a pulley has only one fourth the power of a belt wrapped one half around the same pulley with the same tension.

A line around a post will give a good illustration of this. One half a turn, and a man's weight is doubled: while a full turn, and his weight is nearly enough to stop a heavy boat, and two turns and his weight will stop the boat, or the line will part.

Belts always run to the high part of a pulley when the shafts are parallel; but when they are not, the belt will always run toward the ends of the shafts that are nearest together, and this tendency is much stronger than to run to the highest part of the pulley. If you have a belt that gives trouble in this way, you can see if it is the fault of your shafting by drawing a line across the edges of the two pulleys. Sometimes the bearings may be in line; but the tension of your belt is so great as to spring the shaft, so as to throw the pulleys out of line. A stiffer shaft or another bearing is the remedy. Leather and rubber belts each have their advocates, and each party say theirs is very much better; but each kind is better in its place. Where the belt is clear, a rubber belt will transmit 20 per cent more power with the same tension, and will last as long and run perfectly straight. It can be made of any length or width, of exactly the same thickness in every part, perfectly smooth on its surface; and when in use, every part will come in contact with the face of the pulley. The greater tractile power of a rubber belt is due to its surface elasticity.

Leather belts have to be made from pieces, and, as the leather is not perfectly flat, a perfectly flat belt cannot be made from it. If a belt is cut from the back of a hide, the edges are not so firm as the center, and upon a crowned pulley they will not hug as well as if they were of the same firmness as the center. If the belt is cut from one side of the back, then one edge will be less firm than the other, and the belt will be crooked, and one side will have more tension than the other. Leather belts are usually riveted at the joints. Now, if a rivet head touches the pulley, the friction is less than if the leather touched. If the head is above the surface of the belt, then a portion of the belt is not in contact with the pulley; and if the head is below the surface of the pulley, then of course there is no contact. Now every rivet in a belt is in one or the other of those positions, and leather belts would be improved by using something else in their place. Double leather belts are used more than single ones; but it is clearly a mistake, as a single leather one will transmit more of the power than a double one. If you look at the face of a leather belt, you will see when it has been used for a time, the face has a mottled appearance, light and dark, showing how much of the surface of the belt has been in contact with the pulley. If an average of one inch of width has not touched, then you have paid for one inch of belt that is of no use, but is really a detriment. Double leather belts run straighter than single ones, as the flank side of one part can be put against the back of the others. A double belt will stand a greater tension than a single one, but a single one will stand all that should be put upon any belt.

The cost of belting is increasing every year, and it is well to look out for the belt of the future. My impression is that it will be made of low steel of great tensile strength, and will run upon pulleys, with an elastic surface to give greater friction. The instance I mentioned, of a sheet iron belt running upon cast iron pulleys, is, I believe, in Pittsburgh. But we have a hundred instances of the steel belt upon an elastic surface pulley in this city, in the band saw, and one of a large sawmill sawing logs with a band saw about three inches wide. Now a band saw is a belt, and the power to do work is all derived from the friction between the band saw and the lower pulley. In the case of the sawmill spoken of, it amounts to from 10 to 15 horse power, and this is all transmitted by the saw itself. It may be said that we cannot get belts of steel wide enough to take the place of our large belts. Whenever such belts are wanted, they will be made of any width and length asked for.

Belts of the present make are run with a strain of one fifth their strength; and as the strength of low steels is over 100,000 pounds to the square inch, a belt one foot wide and one eighth of an inch thick would have a strength of 150,000 pounds or more. One fifth of that would give us 30,000 pounds; this strain, upon an elastic surface pulley of, say, 16 feet, running at a speed of 2,000 feet per minute, would give us a belt with the power to transmit over 1,800 horse power. If the belt were one sixteenth of an inch thick, it would be able to transmit 900 horse power. We have no belts now capable of anything like this. How will this belt be joined? When the band saw first came out, that was looked upon as the stumbling block in its way, but to-day they are joined without a thought, and in about the same time that it would take to join a belt of leather. The steel belt would be joined in the same way. Whether this steel belt is the belt of the future or not, there will be wanted a better and cheaper one than we now have, and it is to the practical engineers that we are to look for it.

Encke's Comet.

The return of Encke's comet to our heavens has been for some time expected, but its immense distance (182,000,000 miles) rendered all search with ordinary instruments useless. The large equatorial at the Naval Observatory, Washington,

D. C., was recently put into service, and the comet was seen through this superb instrument by Professor Holden and Paymaster Tuttle of the U. S. N. Its distance rendered the use of the micrometer impossible, and it will scarcely be observable under ordinary conditions for several weeks.

It is known to our readers that the equatorial telescope above mentioned is one of the finest in the world. It is Alvan Clark's masterpiece, and has an objective 26 inches in diameter. Its power is now demonstrated in a remarkable manner

THE POST OFFICE A CARRIER OF MERCHANDISE.

Since the adoption of postal cards for cheap communication by mail, there has been no modification of our postal laws which so greatly accommodates the public as the one permitting the sending through the mails of nearly all classes of merchandise, in packages not exceeding four pounds in weight, at the low price of one cent for every two ounces. The following are some of the articles officially named as belonging to the class of merchandise that can be mailed at this low rate:

We copy from the *Post Office Guide*, which gives this provision of the law:

Rates of postage on third class matter: Mailable matter of the third class embraces all pamphlets, occasional publications, transient newspapers, magazines, handbills, posters, unsealed circulars, prospectuses, books, book manuscript, proof sheets, corrected proof sheets, maps, prints, engravings, blanks, flexible patterns, articles of merchandise, sample cards, phonographic paper, letter envelopes, postal envelopes and wrappers, cards, plain and ornamental paper, photographic representations of different types, seeds, cuttings, bulbs, roots, scions, and all other articles not above the weight prescribed by law, which are not, from their form or nature, liable to destroy, deface, or otherwise injure the contents of the mail bag or the person of any one engaged in the postal service.

All packages of matter of the third class must be wrapped or enveloped, with open sides or ends, so that their contents may be readily and thoroughly examined by postmasters without destroying the wrappers; but seeds and other articles liable, from their form or nature, to loss or damage unless specially protected, may be inclosed in unsealed bags or boxes which can readily be opened for examination of the contents and reclosed; or closed bags, made of material sufficiently transparent to show the contents clearly, without opening, may be used for such matter.

No writing will be permitted on articles of this class, or their wrappers or envelopes, except the address of destination. Any other writing in or upon any package or article of this class will subject it to letter rates of postage.

Matter of the third class inclosed in sealed envelopes notched at the ends or side, or with the corners cut off, cannot be mailed except at letter postage rates.

The following, and some other articles unnecessary to specify, are unmailable: Packages containing liquids, poisons, glass, explosive chemicals, live animals, sharp pointed instruments, sugar, flour, or any other matter liable to deface or destroy the contents of the mail, or injure the person of any one connected with the service.

Persons living at a distance can send small models much cheaper by mail than by any other means; and if properly packed, they usually arrive at their destination in good condition. We receive a number of models from various parts of the country by every mail; and the only trouble we have with packages so sent arises from the sender not following the official rule, which requires that the package shall not be sealed, and shall not contain any writing; and that the full postage on the package shall be prepaid. When the sender does not observe these requirements, we are obliged to pay full letter postage, which makes the cost by mail greater than by express.

By observing the law's requirement, inventors can avail themselves of the mail, for transmitting their models from distant places to this office, to great advantage. But one thing which we would forcibly impress upon our clients is that, by the same mail in which they forward the model, they should announce the sending in a separate letter, giving description of the invention, time of sending model, name of post office and State, and full name of inventor. Observing these rules will save us much trouble, and insure a prompt answer to the sender.

Spiritualism to be Medically Considered.

Dr. G. M. Beard lately read before the Medical Society of the County of New York an extensive paper on "The Relation of the Medical Profession to Popular Delusions, Spiritualism, Mind-Reading, Clairvoyance and Animal Magnetism." He reviewed the many delusions which have appeared in this country on this subject. He looked upon them as a species of epidemics which from time to time immemorial have periodically made their appearance.

A committee of five, consisting of the following gentlemen, Dr. J. C. Peters, Dr. Fordyce Barker, Dr. Ellsworth Elliot, Dr. Austin Flint, and Dr. A. B. Crosby, was appointed to consider, and report on, the following questions:

1. Is the state or condition of mind known generally as the mesmeric state a reality or a deception?
2. If it is a real physiological state, what are the conditions necessary to its production, and what the phenomena attending it?
3. Is it a state to which one mind can subject another, or does it depend on some conditions voluntarily submitted to by the individual?
4. Is it possible, while in this so-called mesmeric trance, or at any other time, or in any other condition known to man in his mundane experience, for one person to divine what is passing in the mind of another, except through the medium of signs?
5. Is there any such faculty known to our race as perceiving, by some mysterious second sight, what is transpiring in

places far beyond the reach of ordinary human vision, or what is written on a paper when an opaque object lies between it and the person attempting to read?

6. Is there any evidence that the well known law of gravitation is ever overcome by a force hitherto unrecognized by scientists?

The members of the committee are all of them eminent physicians in this city, and will doubtless be glad to receive statements of evidence and experience from all who can supply such information.

IN no case in general practice should the pressure, on even the slowest moving journals, be allowed to exceed 1,000 pounds per square inch of longitudinal section with steel journals, or about 600 on iron, in well-worn boxes.

APPLES should be stored in cellars where there is a thorough circulation of air.

DECISIONS OF THE PATENT OFFICE.

NEW PATENT RULE CONCERNING REJECTED CASES.

In the matter of the application of George L. Rouse and M. W. Stoddard for a patent for an alleged "Improvement in Wheels," filed May 18, 1874. On appeal from the Examiner-in-Chief.

Two claims are left in the application which the examiner rejects for want of novelty, citing as references the patents of P. Murphy, August 12, 1873, and the application of Charles Spofford filed August 3, 1874, and rejected the 8th day of the same month. The Examiner-in-Chief has affirmed the decision of the Examiners below, on the ground that the patent of Murphy is a good and sufficient answer to the claims of applicants. They have not discussed the pertinency of the rejected application of Spofford, as a reference.

After a careful examination, I have come to the conclusion that the Murphy patent is not a sufficient answer to the claims of Rouse and Stoddard, which are limited to the special construction shown and described by them. It is admitted, however, that the construction of wheel hubs shown and described in the application of Spofford is almost identically the same as that of applicant. More than two years have elapsed since the final rejection of Spofford's claim, his application is regarded as abandoned under the 32d section of the patent act.

It is insisted on the part of the applicants that, in view of recent decisions of the courts, a rejected and abandoned application does not constitute a bar to the grant of the patent sought by them. It becomes necessary, therefore, to examine this question and determine the practice of the Office in view of the decisions referred to.

Within a few years, several decisions have been rendered in the United States Circuit Courts, in which the effect on patents of prior rejected applications has been discussed; but the question did not receive the attention of the Supreme Court, until the case of *Brown vs. Gould* came up on appeal during the October term of 1873. One of the defenses set up against the *Brown* patent was an old application filed by Remy and Kelly in June, 1850, which was rejected and withdrawn in August following. The evidence showed that the only one machine was ever made by them, and this merely for experiment, in the year 1849. In discussing the effect of this application on the validity of *Brown's* patent, the court uses the following language:

"The experiment made in 1849, when Remy worked it by hand, was a mere experiment which was never repeated. It may have presented one or two ideas in advance of other machines, but it can hardly be said to anticipate the machine which we have described as *Brown's*. Were it not for the application for a patent, it would justly be regarded as an abandoned experiment, incapable of being set up against any other claim. Can the fact that such an application was made and afterward voluntarily withdrawn, and never renewed, make any difference? We think not. Had a patent been actually granted to Remy and Kelly it would have been different. The case would then have come directly within the seventh section of the act of 1836, which makes a 'patent,' or a 'description in printed publication' of the invention claimed, a bar to further patent therefor. But a mere application for a patent is not mentioned as such a bar. It can only have a bearing on the question of prior invention or discovery. If upon the whole of the evidence it appears that the alleged prior invention or discovery was only an experiment, and was never perfected or brought into actual use, but was abandoned and revived by the alleged inventor, the mere fact of having unsuccessfully applied for a patent therefor cannot take the case out of the category of unsuccessful experiments." *Brown vs. Gould*, 6 *Off. Cas.*, 32.

There can be no mistake as to the meaning of this language; the doctrine is distinctly announced that a mere application is not a legal bar to the grant of a patent to a subsequent applicant. This decision must be heeded by the Commissioner of Patents, and govern him in regulating the practice of the Office. I have had frequent occasion to state my views on the necessity of harmony between the practice of the Patent Office and rulings of the courts. There can be no question about the propriety of this course. The Commissioner ought not either to issue patents which the courts will declare invalid, nor to refuse the grant on grounds which have already been considered judicially and declared insufficient. But it will be noticed that the Supreme Court does not entirely ignore abandoned applications, for it is stated that they have a bearing on the "question of prior invention or discovery," and the effect of the application is made to depend on the question of actual use of the invention described therein.

It has been urged in argument that, if no objection appears to the grant sought by Rouse and Stoddard except the abandoned application of Spofford, the Commissioner should issue the patent and allow the question of public use to be determined by the courts. The suggestion is not to be taken, its origin is a misconception of the duty of the Commissioner of Patents. The law makes him something more than a mere ministerial officer, whose function is to issue letters patent simply for the asking. The Commissioner is made the guardian not only of the rights of inventors, but also of the interests of the public. It is just as solemnly his duty to refuse to issue a patent which clearly ought not to be granted, as to grant the issue when the applicant shows an unimpeached right to the invention.

In this case, if without further inquiry the Commissioner should issue a patent to Rouse and Stoddard, and it should afterwards appear that the invention of Spofford was put into public use, it would be invalid, as I understand the decision which has been quoted.

It is his duty, therefore, to inform himself on this question, if possible, and the application of Spofford indicates the direction in which inquiry may be made. The only question in my mind is how to prosecute the investigation. The law restricts interferences to unexpired patents and pending applications.

An interference, therefore, cannot be declared with an abandoned application. I have no doubt whatever, however, that the Commissioner of Patents has ample authority to institute an *ex parte* inquiry at any time, for the purpose of determining whether or not a statutory bar exists to the grant of a patent for which application is pending. This is necessary to enable him to comply with the statute. A satisfactory *ex parte* evidence may be, it appears to be the only source of information open to the Commissioner in cases like the present, without further legislation; and I do not believe that in a single instant a patent should issue for an invention shown in a prior abandoned application without an attempt, at least, to settle the question of public use.

The decisions of the Examiners in Chief, affirming the Examiner on reference to the patent of Murphy, is reversed. The application of Rouse and Stoddard is remanded to the Examiner, who is instructed to forthwith dispatch letters of inquiry to the applicant Spofford, and to his attorney of record, for the purpose of ascertaining whether the invention of the former has been brought into actual use. At the same time, they will be informed that an application is now pending for the same invention, and that the inquiry is made for the purpose of determining the right of subsequent applicants to a patent therefor. Information furnished by them should be in the form of affidavits, clearly and fully setting forth the facts in the case. Counter affidavits will also be received from applicants if they so desire. The issue of a patent will be determined by the information thus received.

Until otherwise ordered, this will be the rule and practice in the Patent Office in like cases. J. M. THURCHER, Commissioner of Patents. Jan. 28, 1875.

NEW BOOKS AND PUBLICATIONS.

DIGEST OF PATENTS RELATING TO BREACH LOADING AND MAGAZINE SMALL ARMS (except Revolvers), granted in the United States from 1836 to 1873, inclusive, Classified according to the Movements for Opening and Closing the Breech. By V. D. Stockbridge, Examiner in the U. S. Patent Office (Class of Fire Arms). Price \$25. Washington, D. C.

The author, in undertaking a work requiring very laborious and patient research, has done good service to a large class of inventors. Over 700 patents are here fully described and illustrated, forming a complete history of the art during nearly 40 years. The illustrations are very clear and elaborate, and the work is sure to be much referred to by inventors and patent solicitors. The author states, with apparent justice, that the high price of his work is justified by the limited sale which such a production can attain.

REPORT OF THE TOPOGRAPHICAL SURVEY OF THE ADIRONDACK WILDERNESS FOR THE YEAR 1873. By Verplanck Colvin. Albany, N. Y.: Weed, Parsons, & Co.

The important survey of the Adirondack region covers nearly 5,000 square miles, and was commenced by Mr. Colvin at his own expense; but it was found to be so important that State aid was, in 1872, granted for the extension and continuation of the work. It is not possible here to describe the scenes of grandeur and the picturesque traveled, or the many valuable results in meteorology and topography achieved, by the investigators; but if any of our readers are interested in this region, the volume now before us will well repay them for the trouble of perusal.

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC AND PHOTOGRAPHER'S DAILY COMPANION. Edited by J. Traill Taylor. New York city: E. & H. T. Anthony & Co., 591 Broadway.

This volume is replete with information on the latest discoveries in photography, written in a pleasant and readable style. We have read the book with

much pleasure, and cordially recommend it to the profession.

THE AMERICAN SPORTSMAN, West Meriden, Conn.

The issue for January 30 has been received. It contains many articles of interest both to the naturalist and the sportsman.

PRINCIPLES OF METALLIC MINING. By J. H. Collins, F. G. S., Honorary Secretary of the Miners' Association of Cornwall and Devon, Author of "A First Book of Mineralogy," etc.

ELEMENTS OF MAGNETISM AND ELECTRICITY, with Practical Instructions for the Performance of Experiments, etc. By John Angell, Science Master of the Manchester Grammar School.

These two excellent little treatises are issued by Messrs. G. P. Putnam's Sons, Fourth avenue and 23d street, New York, at 75 cents each. They are included in the publishers' "Elementary Science Series."

Inventions Patented in England by Americans.

[Compiled from the Commissioners of Patents' Journal.]

From December 28, 1874, to January 14, 1875, inclusive.

BUTTON FASTENER.—D. Heaton, Providence, R. I.
CAR JOURNAL BOX.—J. N. Smith, Jersey City, N. J.
CASTING UNDER PRESSURE.—J. Mackintire, Cambridge, Mass.
CLASP OR BUCKLE.—C. J. Weldon, San José, Cal.
CRIMPING APPARATUS.—A. H. Lowrey et al., Newark, N. J.
CUTTING PLANE.—R. E. Lowe, Kane, Ill.
DRAWERS.—J. J. Fitzpatrick, Philadelphia, Pa.
ENAMELING PIPE, ETC.—American Enamel Co., R. I.
FIRE ARM.—J. Lee, Milwaukee, Wis.
FORMING HAT BODIES.—J. Wharton et al., Newark, N. J.
FURNACE GRATE.—H. Ryder, Mass.
GAS LIGHTING AND HEATING.—L. Arnold, New York city.
HAMMER.—C. Parker, Meriden, Conn.
HAT MAKING MACHINE.—J. W. Corey, Newark, N. J.
KINDLING FIRES.—D. S. Silcox, Charleston, S. C.
KNITTING HATS, ETC.—A. Reed et al., New York city.
LIFE MATTRESS.—J. F. Peck, Springfield, Mass.
LITHOLYCE.—H. W. Bradford, Randolph, Mass.
LOOM.—C. H. Chapman, Shirley, Mass.
LOOM.—G. Crompton, Worcester, Mass.
MAKING HORSE SHOES.—J. Russell, New York city.
METAL CARTRIDGE.—A. C. Hobbs et al., Bridgeport, Conn.
MUSICAL INSTRUMENT.—M. J. Matthews, Boston, Mass.
PACKING MATERIAL.—W. S. Fish (of Mystic, Conn.), Glasgow, Scotland.
PIANOFOORTE.—W. B. Miller, Baltimore, Md.
RIVETING MACHINERY.—M. Bray, Boston, Mass.
ROTARY PUDDLER.—W. Sellers, Philadelphia, Pa., et al.
SCHOOL TEACHING APPARATUS.—M. McVicar, Potsdam, N. Y., et al.
SHARPENING TWIST DRILLS.—C. Van Haagen, Philadelphia, Pa.
SLIDE VALVE.—S. F. Dodge, Detroit, Mich.
STEAM OR AIR ENGINE.—G. J. Wardwell, Rutland, Vt.

Recent American and Foreign Patents.

Improved Self-Discharging Hay Bake.

S. G. Hurlbut, South Union, Ky.—This invention consists of pivoted parallel rake heads, mounted on a rockshaft, for the purpose of dumping or raising the teeth of the ground when the rake is being transported from place to place. The wheels are smaller than usual, and the heads extend over and beyond them on either side. The teeth, which are hinged at their connection with the head by means of a hingeplate, are so controlled that they can be set at an angle receding one from the other, to the right or left, for the purpose of discharging the hay at either side of the rake in one continuous windrow without lifting them from the ground, thereby making a continuous raking, discharging the hay as fast as gathered from the side in a neat, light manner, leaving it in good condition for further curing.

Improved Coffee Roaster.

Michael W. Fry, Guyandotte, W. Va.—This invention relates to certain improvements in coffee roasters, and it consists in the combination, with a rotary moving cylinder, of an angular projecting air chamber upon the inside of said cylinder, which causes the coffee, when passing from one side of the cylinder to the other, to leave the hot periphery of the cylinder and fall over the shelf formed by the air chamber, by means of which the coffee is roasted uniformly and prevented from burning. It also consists in combination with the air chamber of a stop pin or plate attached to the cylinder, and ledges or flanges upon the framework, which limit the reciprocating motion of the cylinder to a semi-revolution.

Improved Hay Derrick.

George W. Martin and James C. Moor, Brookston, Ind.—This invention relates to certain improvements in hay derricks. It consists in two A-shaped frames, connected at the top by a wire cable, and held slightly inclined toward each other by guy ropes attached to picket pins. Upon said cable rests a movable frame containing two sheaves, one running upon the cable and the other supporting the rope attached to the hay fork. This movable frame engages with a latching catch at one end of the cable to hold it stationary until an adjustable stop unlatches the device and allows the frame to pass laterally to the desired position, the movable frame being restored to its original position by a weight suspended upon a pulley running on the guy rope.

Improved Shutter Fastening.

John D. Jones, Omaha, Neb.—The invention consists in using a box that allows the notched locking bar or rod to pass through slots thereof, while the bolt and spring are fully protected, and yet easily operated by the thumb piece.

Improved Lamp Burner.

Aaron C. Vaughan, Rainsburgh, Pa.—The invention consists in means whereby a stronger light may be obtained without the consumption of additional oil, the same being accomplished by a more perfect supply of oxygen and less consequent waste in the shape of partially combusted carbon.

Improved Car Coupling.

Menasch Pettengill, Minneapolis, Minn.—The invention is an improvement in automatic car couplings, and consists in providing the sliding head of the buffer with a series of parallel, horizontal, semi-circular grooves or cavities to receive the curved end of the link, the construction being such that the latter may be held or supported horizontally at various angles, or readily changed from one groove to another without withdrawing the coupling pin.

Improved Lamp Stove.

Edward A. Ripplingille, Holborn, Middlesex county, Eng.—The object of this invention is to provide a combined stove and lamp in which the heating properties of a lamp are utilized to form a small cooking stove, and the lamp still allowed to perform its function of lighting the room. It consists in a flat lamp of peculiar construction which slides into the stove frame, which latter is provided with reflectors and a glass door.

Improved Car Coupling.

Benjamin Slusser, Sidney, Ohio.—The invention consists in novel means whereby cars may be conveniently coupled, securely held together, and easily uncoupled, while a car that switches off the track will at once become disengaged, and those whose drawbars are of unequal height are coupled with the same facility. It is without a coupling pin or other device susceptible of being lost or readily stolen.

Improved Croquet Mallet.

Thomas H. Logan, Fort Leavenworth, Kan.—The invention consists in making the mallet stock in two sections, recessed to receive a handle, and held by clamp screws.

Improved Smoke Stack.

Darerrick Allard, St. Albans, Vt.—This invention relates to certain improvements in smoke stacks for locomotives, etc., and it consists in an adjustable discharge pipe for the cinders and sparks contained inside the smoke stack, and terminating above in a funnel-shaped mouth, in combination and concentric with an inverted conical plate provided with spiral grooves, an annular cap for directing the current down the interior of said plate, and an inverted conical cage of gauze wire; whereby the draft of the smoke stack is regulated and the sparks and cinders eliminated and carried off.

Improved Funnel for Barrels.

August Pfarr, Baltimore, Md.—The invention relates to funnels through which liquids are run into barrels, casks, and other packages, and consists in a novel indicator by which it will always be promptly shown when the package is full, and by which all waste is effectually prevented.

Improved Box for Car Axles.

John M. Brosius, Richmond, Va.—The invention relates to axle boxes generally, but particularly to the middle boxes of trucks adapted to changeable gages, and consists in the several features of improvement whereby the axle box is rendered more easily removable, the lubricant more readily injected upon the ends of the journals, and each axle to certainly follow the other in turning off upon switches.

Improved Design for Graves.

Isaac G. Lunday and C. G. Anglin, Hickory Flat, Ala.—The invention consists in placing over the grave successive slabs growing successively smaller, until the highest is reached, when a monument, shaft, or column surmounts them all.

Improved Railroad Car Truck.

John M. Brosius, Richmond, Va.—The invention consists in certain novel features of invention by which car trucks may be adapted to use on railroads of different gages, spacing the wheels automatically to suit each change of gage, and thus rendering entirely unnecessary the breaking of bulk in the freight, or the transfer of passengers from one road to another.

Improved Car Coupling.

George W. Call, Nashua, N. H.—On the approach of cars, link-supporting lever frames are first brought in contact, and are gradually swung below their respective drawheads, while the link enters at the same time into the cavity of the drawhead to be coupled. The concussion of the drawheads carries both in backward direction, and releases thereby latch levers from their seats, dropping thereby pin guide frame and pin, and coupling the cars.

Improved Cotton Press.

William T. Crenshaw and Robert J. Carothers, Burton, Tex.—The invention relates to a perforated hopper into which the cotton is received from the gin, and from which it is discharged by feed rollers into the press; also, to locking the revolving press box to a fixed base, and thereby relieving its pivot bearings of the strain due to the action of the screw which operates the follower.

Improved Car Coupling.

Henry Dutcher, Port Jervis, N. Y.—As the cars are run together and heads formed upon the coupling bars catch upon each other, the downwardly projecting parts of the upper head straddle the body of the lower head, which prevents the coupling from being uncoupled by the lateral movement of the cars.

Improved Toy Bubble Pipe.

F. Wright Pease, Metuchen, N. J.—This invention consists in the combination, with a flexible stem and suitable mouth piece, of a bowl provided upon the edges of its mouth with ledges, projections, or grooves, which, by retaining a portion of the soap solution, enable the operator to blow a much larger bubble.

Improved Eaves Trough Hanger.

Edward Kirk, Jr., Sheridan, Ill.—This consists of a lateral brace, with forked ends or prongs, which are driven in horizontal direction through the gutter near its inner edge into the frame of the roof. The prongs are bolted to a metallic band, arranged to embrace with one end the outer rim of the same, while the upwardly inclined rear part is attached to the shingles and roof frame.

Improved Range.

Edwin O. Brinckerhoff, New York city.—The space between the bottoms of the inner and outer cases is occupied by a drawer, the interior of which is divided into two equal parts by a vertical division plate. The side parts of the drawer are divided into flues by vertical division plates, extending from the ends of said drawer nearly to the central division plate. The rear division plates are placed a little in front of the rear wall of the inner case. The spaces between the inner ends of the rear division plates and the central division plate are provided with dampers, which are raised and lowered, to close and open said spaces. The flue for conducting the products of combustion from the range to the chimney projects in the rear of the middle part of the back of the outer case, and fits into a recess formed to receive it in the brick work inclosing the rear part of the range. The flue is divided into two equal parts by a vertical division plate, openings into the flue being formed through the lower middle part of the back wall of the outer case, and in line with the spaces at the sides of the central division plate of the drawer.

Improved Horse Power.

Reuben Stiles, East Troy, Pa.—This invention is an improved horse power for operating a churn, and for other purposes, which is so constructed that its rear end may be conveniently raised and lowered to give the endless chain any required inclination, and the endless chain may be conveniently tightened or slackened, as may be desired. To the front parts of the frame of the machine, at a suitable distance from their lower ends, are attached bearings in which a shaft revolves. To one end of the shaft is attached a crank wheel, from which motion is given to the machinery to be driven, and which is made heavy, to adapt it to serve as a fly wheel. To the middle part of the shaft, at a suitable distance apart, are attached two wheels, the rims of which are notched to receive rods, which are connected to each other by straps to form an endless chain, and to which are attached the cross bars or planks, upon which the horse or other animal walks, to give motion to the machine. The inventor is willing to negotiate for the sale of territory or to manufacture on royalty, and can furnish patterns and directions for the use of intending manufacturers.

Improved Harrow.

Peter S. Carhart, Collamer, N. Y.—The bars of which the beams are composed are clamped together by bolts with teeth, and bars or metal plates between them, either one or both being notched to receive and hold the teeth. The notches in the clamping plates are contrived with extensions inclined front and back, above in one direction and below in the other, and the teeth are pivoted, so that when the harrow is drawn in one direction the teeth will be vertical, and when drawn in another direction they will be inclined. The tooth shifts according to the way the harrow is drawn, but at the same time is held tight.

Improved Cheese Knife.

George E. S. Phillips and William A. Young, Berryville, Va.—The knife is made of such a length as to reach from the center to the edge of the cheese, and the ends are attached to a semicircular bar so that it has a slight longitudinal rock. The outer end of the knife and bar are held down by a spring, the free end of which rests upon the outer end of the curved bar, so that the knife may operate with a sliding cut, cutting the cloth first. A suitable construction enables the arm, to which the knife and bar is secured, and its attachments to be swung out of the way to enable a cover to be placed over the cheese.

Improved Pump.

George Harrison Laub, West Lebanon, Ind.—The invention relates to the means whereby the lower valve is detachably connected to the side of the inclosing cylinders, and the seat for said valve is adapted for ready removal when the sand collected beneath and around it requires to be washed out of the cylinder.

Improved Bouquet Holder.

Jurias G. Dreher, Pine Grove, Pa.—This invention is an improved bouquet holder, simple in construction and convenient in use, which will keep the stems of the flowers moist, and thus keep the flowers fresh for a long time, and which may be carried about without spilling the water. It consists in the combination of a slotted tube, conical flange or cup, gun elastic case, and sponge with each other and with a rod and conical base, a rubber plate, a flanged tube, and a spring bolt, which together form a well arranged device for the stated purpose, adapted for use as a vase as well as for carrying in the button hole, etc.

Improved Beer Regulator.

John Obrecht, Tell City, Ind.—For the purpose of providing a simple apparatus for regulating and preserving beer, a larger water receptacle is provided, with an interior smaller gas reservoir. The same is connected, by intermediate branch pipes with a check valve and stopcock, to the gas-distributing pipes, with stopcocks and water indicators, and then to the kegs containing the beer for the action of the gas thereon. The water tub is connected by a pump with the faucets of the empty kegs, for pumping water therein, and so as to force, by the distributing and reservoir connecting pipes, the liberated gas back to the reservoir for being applied to the next keg to be tapped.

Improved Process of Coloring Photographs.

Jeremiah Gurney, New York city.—The photographs are retouched and colored on the front side in the usual manner, and then rendered transparent by the application of a suitable mixture of white wax and kerosene. The colors are thus already fastened to some extent to the front side of the picture. A thin coat of glycerin is then applied to the front side of the picture, for fixing the colors and protecting them completely against the action of the gelatin, into which the picture is immersed, and then, faced downward, placed on the collodionized plate glass. The gelatin or binding substance forms the connection of the photograph and the collodionized surface. The excess of gelatin is then gently pressed out and the whole dried and hardened, being ready to receive the finishing coloring on the back of the picture. As the picture is transparent, it may be worked up with equal facility as on the front side, without the risk of losing the likeness, while the colors appear with an exquisite softness and delicate finish. One or more thicknesses of cardboard soaked in warm gelatin are next placed on the back of the picture and the whole dried again, to be then cut around the edges for taking it, with the enameled surface, off the glass plate, the enameled surface adhering firmly to the photograph and protecting the same.

Improved Car Propeller.

Casper Devilbiss, Shellsburg, Iowa.—A series of posts is set in the ground on each side of the railroad, in order to support wheels having a high flange on the outside. These wheels may have each a separate shaft, but it is preferred to hang them on the ends of shafts which span the road. The bars of the car frame are made to run between the flanges of wheels and on their peripheries. A guide and friction bar is elevated over the middle of track, and friction rolls are provided, between which the bar is passed. The upper roll is attached to a sliding gate and made adjustable, so as to increase or diminish the friction, according to the load. The lower roll is connected with and worked by the engine, which is arranged on the car in any convenient position. By turning the crank the rolls are turned so as to then bite upon the bar, thereby drawing the car over the wheels.

Improved Sawing Machine.

George W. Bell, Orange, Tex.—In this device sleeve boxes for the shaft which drives the saw are employed in consequence of the great weight of the saw and swing frame, to relieve the shaft, by being permanently fixed in the frame, so as to support the weight. The push bar, for feeding the saw to the log, is jointed to the swing frame at one end, and works between friction feed rollers, one of which is arranged in fixed bearings, and the other in sliding bearings, which are connected with a lever. The latter is forced down on the feed bar to set it in motion by the hand, and raised to throw it off to stop the bar by a spring. A weighted cord turns an eccentric pulley, which is so connected with the swing frame by a cord that, when the feed rollers are thrown out, the weight will, by turning the pulley and winding a rope upon it, swing the saw back.

Improved Machine for Melting Snow.

Charles G. Waterbury, New York city.—The essential feature of this invention consists of a series of burners for hydrocarbon oils, arranged on a portable machine, in combination with a reservoir or a retort and suitable pipe connections for supplying the oils or vapors to the burners. The arrangement is such that when vapors are burned they will be discharged into the burners with the requisite force by means of pressure in the retort, to drive the flame down on the snow and ice to be melted with great force. The invention also consists of the combination, with the above, of a steam boiler and pipes, for discharging steam jets into the burners, or below them, to combine with the vapors or oils, both for impelling the flame and for increasing the heat. Another feature of the invention consists of runner plates attached to the sides of the machine for closing in the space under the machine to the ground, for confining the heat, the said plates being capable of rising and falling, as required by irregularity of the surface, and for lifting them off the ground when the machine is to be turned around. There is also a horizontal revolving brush of steel wires, closing in the under space immediately in front of the burners, to prevent the escape of heat that way, and to be used for stirring and breaking up and throwing the particles of snow into the flames behind.

Improved Combined Baby Jumper and Swing.

Clara Jane Haney and Sarah Ann Coleman, Edwardsburg, Mich.—A bracket supports, by means of a strap, a framemade of two vertical rods and two cross bars. The vertical rods pass through a sliding cross piece, beneath which are spiral springs. The straps for holding the child are connected with the cross piece.

Improved Almond Grater.

Julius Levy, San Francisco, Cal.—This is a roughened porous cylinder revolving within a hopper, the bottom and sides of which are also roughened, and conform with the roundness of the cylinder near its base. This insures the almonds being thoroughly grated before passing into the receptacle below.