WHAT IS THE THEORY OF THE WATER POLISH?

This is a question of a correspondent, and although in our practice as a machinist we had, times without number, used water in taking the finishing chip for shafts, journals, etc., we had never considered the question. Uponinquiry of other practical men and of scientists we find the same ignorance prevailing, and, in their attempts to explain, a difference of views. These questions are valuable as leading to new improvements and discoveries. If a workman merely knows that a certain process will produce a certain result, without knowing the why and wherefore, he stands at the threshold of the temple and must ever remain in the outer court. The reason why can be found only within.

One theory presented is that the friction of the iron against the edge of the tool produces heat, however slowly the work is performed, and that the edge is therefore disintegrated and roughened which prevents it from leaving a smooth or rather a polished surface. That the only use of the water is to keep the edge of the tool cool and therefore intact. We do not accept this theory. To be sure water is sometimes used in turning iron for the purpose of keeping the cutting edge of the tool intact by preventing it from heating when a heavy chip is taken or the lathe driven rapidly. This use of water, however, is only a make-shift intended to facilitate work by saving time.

If the only use of water in turning wrought iron is to keep the tool cool, why is soapy water, or water containing a solution of carbonate of soda used in preference to clear water? They are of no lower temperature than pure water. Again, if the roughening of the edge of the tool is the cause of its not leaving a polish when used without water, this roughening must take place instantly; for every machist knows that without water he cannot leave a polished surface even in a part of one revolution.

We prefer to attribute the result of the combined action of the tool and water to lubrication. In ordinary turning the "diamond point" or "bossing tool" is used. Its action, as it is fed along while the shaft is turning, is to cut on the shaft a screw thread, differing from the ordinary screw thread only in being much finer than the thread of screws commonly used. However slow may be the lateral feed the result is a screw, if the diamond-pointed or V-shaped tool is used. Now the surface of the turned iron is a series of depressions and elevations; a longitudinal section would show serrated edges. To produce a perfect surface these projections must be removed. This is what the square-nosed finishing tool does. But this square-nosed tool, if used without water or oil, while it will leave a smooth surface, will not produce a polished one; the lubricator—water or oil—does this. The water fills the spaces between these projections on the surface of the iron and interposes between the tool and the solid surface; the finish cut merely scraping this solid surface.

That water is a lubricator cannot be denied, as itis the only lubricator that ever reaches the stern bearing of a propeller shaft, and it is used to lubricate the steps of the spindles of turbine wheels. The grease and alkali forming a diluted soap in suds or soda water is a better lubricator.

Recent American and Foreign Patents.

Under this heading we shall publish wee ly notes of some of the more prominent home and foreign patents.

LATHE.—H. L. Morse, New Bedford, Mass.—The object of this invention is to construct a lathe on which straight work may be turned as well as tapering and the latter as good as the former.

SELF-LOCKING APPARATUS FOR FERRY BOATS.—James L. Canham, Newark, N. J.—This invention has for its object to furnish an improved self-acting lock by means of which the boat may lock itself in the slip.

DUNG HOOK.—Jacob G. Good, Rapo, Pa.—This invention has for its object to furnish an improved hook by means of which the dung and bedding may be easily and expeditiously drawn out of stables.

MATTING.—John Michell, West Farms, N. Y.—This invention has for its object to furhish a cheap and serviceable matting to take the place of cotton and other mattings, and the coarser varieties of carpeting.

MACHINE FOR SAWING SHINGLES.—Rev. Enoch Conger, Lexington, Ohio.—This invention has for its object to furnish an improved machine by means of which one or more tapering shingles may be sawn from a block at one operation.

BLIND FASTENING.—Ebenezer B. Beecher, Westville, Conn., and Joseph G. Davis, Henry S. Frost and Anthony Davis, Watertown, Conn.—This invention has for its object to furnish a simple and convenient means by the use of which a blind or shutter may be securely locked in any desired position.

BUTTON FOR FASTENING CARRIAGE CURTAINS, ETC.—Solomon Bidwell, Bordentown, N. J.—The object of this invention is to construct a device whereby carriage curtains can be easily buttoned to the body of the carriage or to the bows of the wagon top, or to any other part of the carriage or vehicle, and whereby the curtain will be securely held in the desired place but can be easily unbuttoned again when desired.

SEED PLANTER.—E. E. Chesney, Abingdon, Ill. This invention has for its object to furnish an improved seed planter by means of which corn or other seeds may be planted accurately in check rows or in drills, as may be desired

STUMP EXTRACTOR.—M. Mellen, Richland Station, N. Y.—This invention relates to a stump extractor which will do its work with the greatest efficiency and which is so constructed that power may be applied to it on either side or on both as may be required, and which will furthermore allow of an easy adjustment of all its parts and may be conveyed easily from one place to another.

CAR COUPLING.—Narcisse Reaves, DuQnoin, Ill.—This invention has for its object to furnish an improved coupling for railroad cars which shall be self coupling and at the same time simple and strong in construction and reliable in operation.

WINDOW SASH AND BLIND FASTENER AND LOCK.—Leander Pollock, Fishkill Landing, N, Y.—This invention has for its object to furnish a convenient means for fastening and locking window sashes and blinds.

BACK REST FOR LATHES.—H. C. Berry, Wauseon, Ohio.—This invention relates to an improvement in a back rest for lathes used for wood turning and consists in a movable segment placed vertically in the lathe in place of the ordinary back rest and provided with two adjustable friction rollers which bear against the piece of timber to be turned, and hold it steady.

VENTILATOR FOR RAILROAD CARS AND BUILDINGS.—Robert C. Graves, Barnesville, Ohio.—This invention relates to an improved ventilating apparatus to be applied to railroad cars, vessels, vehicles, public halls, churches, dwelling houses, etc., and consists in a metal or other pipe running through the car, vessel, or building having funnel-shaped openings on the outside for the admission of fresh air and provided also with peculiar arrangements for directing the fresh air into a car or room,in its passage through the pipe and for the discharge of foul air.

BOTTLE STOPPER.—Robert Robinson, Brooklyn, N. Y.—This invention has forits object to furnish an improved stopper that will close the bottle securely against the escape of gas therefrom, and which shall be so constructed that the greater the pressure the closer and firmer the stopper will be secured in its place.

MACHINE FOR MIXING COMPOSITIONS.—Albertis Eagle, Trenton, N. J.—The object of this invention is to construct a machine, in which two or more ingredients can be united promiscuously into a compound. It is chiefly intended for mixing powdered slate with tar, for a roofing composition, but may be used with equal advantage for other compositions.

STALK CUTTER.—William Dexter, Augusta, Ill.—This invention relates to a machine for cutting up standing corn stalks on the field, so that they may be plowed under the soil and rendered available as a manure or fertilizer, thereby avoiding the labor and expense of cutting them by hand and transporting them from the field, or piling them up and burning them.

CLAMP FOR HOLDING ARTICLES WHILE BEING PLANED OR MILLED.—S. A. Morse, New Bedford, Mass.—This invention relates to a clamp for securing articles firmly in position while being planed or milled. The object of the invention is to obtain a device for the purpose specified which will admit of the articles being, not only clamped with facility, or very expeditiously but also in proper position relatively with the cutting tool in every instance.

ALARM LOCK FOR TILLS.—D. K. Miller, Bernville, Pa.—The object of this invention is to obtain a simple and efficient alarm lock for tills, one which may be economically manufactured and applied and be capable of having a number of changes or different combinatians effected in, the arrangement of certain working parts so as to require different manipulations thereof in order to admit of the till being opened.

ATTACHMENT FOR VEHICLES.—Edward Nason, William Nason and Oliver K. Nason, Orneville, Me.—This invention relates to a draft attachment for vehicles and has for its object the ready attachment of a horse to a vehicle and ready detachment therefrom, and a strong and durable construction and arrangement of parts.

AUGUR.—Charles Boernicke, Philadelphia, Pa.—The object of this invention is to arrange an auger so that the hole bored may be gradually enlarged at the bottom, for the purpose of more securely joining two pieces of wood.

CULTIVATOR AND CORN PLANTER.—Isaac H. Chappell, Lawrence, Kansas.—This invention consists in so constructing and combining a cultivator with a corn planter that the ground may be cultivated, and at the same time corn may be planted in the most perfect manner.

MATCH SAFE.—John Roebuck, Brooklyn, N. Y.—This invention relates to a match safe of simple construction, which is arranged with a design to cheapness and simplicity, while it answers all the purposes for which it is intended. The invention consists in the arrangement and construction of a match safe, the lower part of which forms a match box and is closed by a falling lid, which is hinged in a peculiar manner. The upper part of the de device is so shaped that it is capable of receiving and holding waste matches.

CATTLE PUMP.—Miles D. Wilder, Laporte, Ind.—This invention relates to a class of pumps designed for supplying cattle and horses with water, and by which they are made to pump the water which they drink from wells or reservoirs in fields or yards.

COOKING KETTLE.—Benjamin W. Dunning, Brooklyn, N. Y.—This invention relates to a simple and valuable combination of the ordinary and indispensable culinary kettles, pans, and pots used by every family, whereby all the heat is made available, the different parts being so arranged that each one may be used for itself or in combination with the rest, as may be desired.

ATTACHMENT TO SLEDS, ETC.—Philip Bourne, Williamsbridge, N. Y.—This invention relates to a novel attachment to children's sleds, by which they can be readily propelled or moved over the surface of the ground.

STOVE.—Obadiah G. Kennel, Ezrah Smith, and Gardner L. Morrison, New York City.—This invention relates to stoves, in which gas, coal, and other oils, etc., are employed and burned.

BRIDLE.—James Harris, Kansas, Ill.—This invention consists in the combination with the bridle bit of tubes through which the cheek-straps pass. To these cheeks a pair of reins are buckled, which reins are in addition to the ordinary driving reins hung to the bit-rings.

TOOL.—Philip Weck, Brooklyn, N. Y.—This invention relates to a tool for securing the covers to cams by compressing such covers about the sides of the cams.

CAR BELL.—A. Borronman, New York City.—This invention consists in pivoting the hammer of the bell and in connecting the end or rope directly thereto.

BOOT JACK.—H. D. Boss, Williamsburgh, N. Y.—This invention consists in the use of india-rubber within and around the jaws of a boot jack, for the purpose of obviating any slip of the boot, when being pulled off the foot.

ATTACHMENT FOR STOVE PIPE.—Ira S. Bullard, Geneva, N. Y.—This invention relates to a regulator for stove pipes, whereby the draft of the stove, etc., can be more perfectly regulated or adjusted.

CORN HUSKING SHIELD.—Almon C. Robinson, Louisiana, Mo.—The object of this invention is to provide a metal shield to be worn on either thumb for protection of the hand against the rough cutting surfaces of corn husks,when they are stripped from the ear, and to expedite the work of corn husking by the more effective operation of the instrument than that of the naked hand.

GLASS CLEANER.—J. B. Dunlop, New Haven, Conn.—The object of this invention is to provide an article for cleaning glass and other substances, on the surface of which have accumulated hard stains of paint, dirt, etc. For this purpose I have a small plate of metal, such as hardened iron or steel, on the upper side of which I form a handle by which the cleaner is held. On the under surface or face of the cleaner I form flutes or V-shaped grooves,which run diagonally across its face, and form a series of knife edges thereon; between each groove is left a flat surface, in order to prevent the glass or other article from being cut or scratched. When this cleaner is brought in contact with a pane of glass on the surface, on which have accumulated stains of paint or other substance, and rubbed to and fro, a thorough cleaning thereof is accomplished.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us: bes des, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruct on of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

J. B. M., of Ind., certifies to the good effect of cold water in alleviating heart burn. He takes it in doses of about 2 oz. every 5 minutes. Hehas used the remedy for years and has found it infallible.

F. C., of Ind.—We have heard of castor oil for softening and preserving leather, but never tried it. We can recommend good neatsfoot oil as excellent.

A. D. B., of Mass., asks: "What is the actual horse power of an engine, diam. of cylinder, 13 1-8 inches; stroke, 80 in.; revolutions per minute, 72; pressure of steam in boiler 80 lbs.; steam cut off in cylinder at halfstroke." Your question does not contain all the data necessary to a correct answer. You say you have 80 lbs. in the boiler; you do not say whether you have a governor throttle between boiler and cylinder, nor give the length and size of steam and exhaust pipes. If, however, you get yourboiler pressure—80 lbs.—on yourpiston cutting off at halfstroke, the mean pressure would be be 67.4 lbs. and the gross horse power would be 99.078. The indicator is the only reliable method of determining the amount of power developed by your engine.

E. B. C., of Conn., asks if the pressure on the lower part of a steam boiler is greater or less than in the upper part, the weight of water not being considered. As we understand it, the pressure of steam is the same in every direction. Why not?

C. F. S., of N. Y., asks: "What is the rule for calculating the speed of pulleys driven by belts from larger pulleys?" We reply: As the speed of the driver is to that required for the driven, so is the diameter of the driven to that of the driver. Ex. A pulley 36 in. diameter turns 150 times per minute. Speed of the driven to be 450. Required, size of driven pulley. As 150 is one-fourth of 450, so the driven should be one-fourth the driver—9 inches, . . . The best oil we know of for valves and cylinders is good sperm or lard oil. Pure tallow is also good, as the heat of the engine keeps it in a liquid form.

C. R. C., of Pa.—In Wheatstone's and Siemen's experiments described in No. 14 Vol. VI complete magneto-electric machines were employed The obscurity of the notice occurred from omitting to say that the armatures were combined with magnets in the usual way. The error was the fault of the foreign reports.

P. D., of C. W.—Three methods have been used for determining the quantity of steam used by an engine. 1st. Measuring the water which is put into the boiler. 2d. Using as data for calculation, the cubical capacity of the cylinder, number of revolutions and pressure of steam. 3d. The use of the indicator. The last method is the most accurate and least troublesome. But when great exactness is sought for, the three plans should be employed at the same time, in order to serve as checks against the errors of either.

J. D. H., of Minn.—"How many round balls an inch in diameter can be put into a cubical box one foot on a side?" This is a very good nut for the juveniles to crack. J. D. H. has been informed that a large prize has been offered for a solution of the problem, but we do not believe it.

J. W. L., of N. Y., supposes air to be condensed in a cylinder to half its volume by pushing down the piston half way, and another cylinder with piston same diameter, but half the length. Now let a quantity of compressed air equal to that in the first cylinder be let under the piston of the second cylinder, will it have as much effect as the compressed air of the first? Certainly.

A. C. R., of N. Y.—"Does the axis of a vertical wheel in motion impinge on the same points of its bearing that it does when in repose?" No. The tendency of the wheel in motion, is to roll up one side of the axis.

G. B. M., of Iowa.—Your cellar seems to be damp for want of ventilation. If this theory be correct, you can no doubt easily prevent the evil, by means of some simple arrangement of partitions and inlets and outlets of fresh air. The outlet might be connected with the chimney.

R. S. T., of Mass.—1. The sphere and spheroids were once common forms of the electrical machine. They are not so convenient as cylinders. 2. Leyden jars coated with the amalgam used for mirrors would operate pretty well, but it would be very difficult to make them. 3d. Substitutes for the Leyden jar are often made by coating flat glass plates. 4. A battery may be made by arranging the jars concentrically in a nest. In this case the jars of course must be wider at top, than at the bottom.

E. V. W., of Pa.—If you boil tar the more volatile portion is expelled and the residuum is pitch. The pitch or asphaltum as it is often called, of coal tar is used for roofing and as a cement.

J. P. B., of M.—The ordinary oil paint seems to be in most common use for marking by the stencil plate. All colors of paint work well. Any water solution or mixture of color and sizing, of the proper consistency also answers the purpose.

J. H., of Minn.—Rancid butter is much improved by reworking in ice cold water. The sweetening is hastened by adding to the water a small quantity of bicarbonate of soda.

A. T. B., of Mass.—We are not aware that any distinctive name has been proposed for the solids which have an elliptical base.

C. A. G.—Only the inventor or his agent can obtain information at the Patent Office concerning a case prior to the actual issue of a patent.

W. S. M., of Ohio.—1. Emery is used in grinding lenses and rouge in polishing them. 2d. The best cast steel should be used for the springs of fire arms. 3d. Paper is made sensitive to light by bru hing over it solutions of salts of silver.

J. M., of N. Y.—"Which would be the easier to drag up grade 3,000 lbs. on 44x48 inch wheels or the same weight on 48x52 inch wheels. Or which will run easier up grade large or small wheels." The effect of wheels on vehicles is simply to lessen the friction of the draft, and large wheels are more efficient than small ones. The size of wheels is determined, however, mainly by the hight from the ground of the line of draft, in other words the hight of horses. In going up or downgrade the same principles apply. On a grade, however, the hight of the load might be of practical importance, as the direction of the weight of load with reference to the axes of the wheels would be changed. The more direct answer to J. M.'s questions would involve more data than he has given, such as hight and habits of his horses, etc.

L. M. C., of Iowa.—There are several new processes for making artificial stone, but we have not yet learned that any of them have proved entirely satisfactory or a commercial success. The ancient process of baking clay into brick has stood the test of all ages and climes. It is scarcely to be hoped that we shall have any successful rival to brick.

A. D., of Mass.—Starch water spread on glass makes an excellent substitute for ground glass to be used in backing up stereo-transparencies.

G. H H., of Mich.—1. When heated from 32 deg. to 212 deg. zinc expands at the rate of 1 in 340, lead 1 in 351, silver 1 in 524, brass 1 in 536 copper 1 in 582, untempered steel 1 in 926. 2. The rate of expansion increases slightly at higher temperatures. 3d. It will be seen from the above figures that there is no definite relation between the specific gravity and expansibility. 4. Tubes and rods expand in length at the same rate. 5. The temper of metals affects their expansibility. 6. Address Henry Carey Baird, Philadelphia, for a treatise on watch making.

H. L. N., of Mass.—"Fill a wine glass so full of wine that another drop will make it overflow. Now you may drop into the wine as many needles as an empty glass of the same size can hold, and the wine will not overflow." Something like the above is constantly floating about in the newspapers, and it has been so often repeated that a great many people really believe it. The statement has little encouragement from science or experience. A needle or any other solid body, in proportion to its bulk, will displace the liquid in which it is immersed.

W. P. B., of Wis.—Naked wire was much used in the early days of electro-magnetism for making helices. With proper care in winding, electro-magnets so made are quite as good as others. The layers of the helix are well enough kept apart by common paper. Silk thread used for the same purpose would be no improvement. . . . . A dozen Grove's cups will give a good light by way of heating platinum wire. Fifty or more are required to give a satisfactory light from carbon points.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

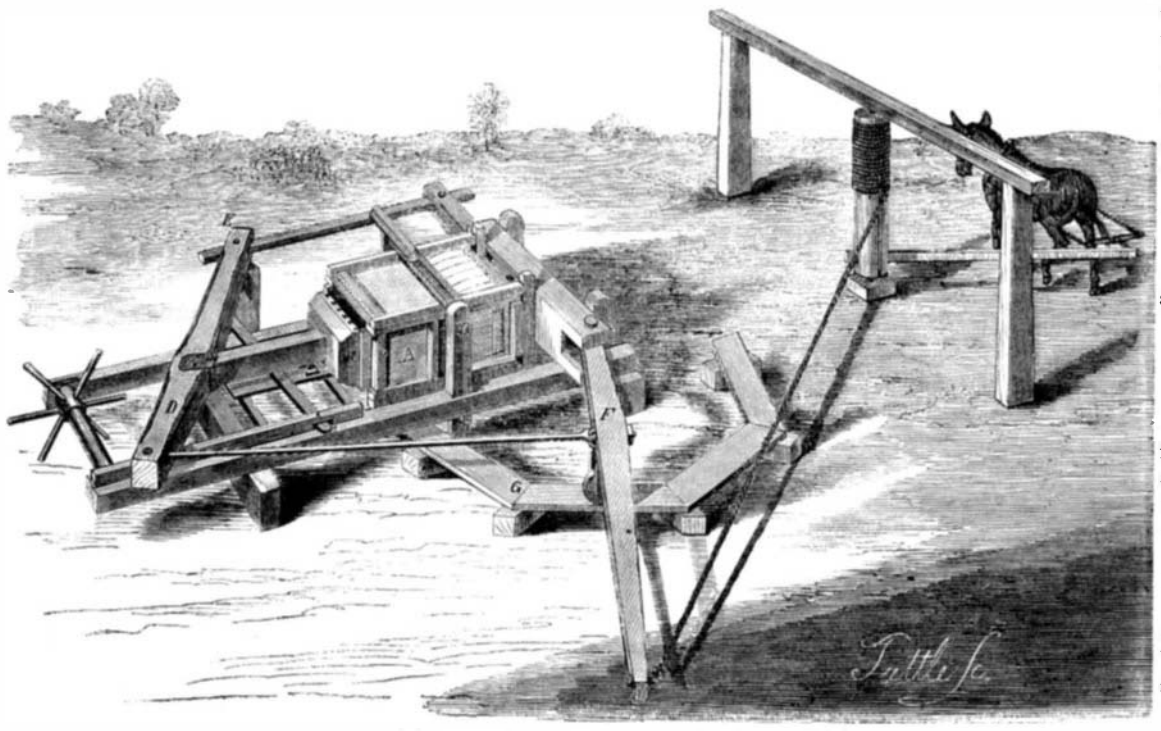
R. Miller, Perth, Lanark county, C. W., wishes to communicate with manufacturers of screw and stud machinery, separately or combined.

A. Tweedy, Collinsville, Ohio, wishes to correspond with an aeronaut.

Horizontal Cotton Press.

For transportation of bulky bodies, as cotton, hay, and cloths, the work of compressing into convenient sized bales is almost imperative. Facility of handling as well as economy of room is thus assured. The screw is often used for this purpose, but it is well known that the power to be exerted increases with the resistance to be overcome, so that there is a limit to its use. The hydraulic press is costly and not always convenient to procure. The engraving represents an efficient baling press so simple in its parts and operation that it may be constructed on the plantation or farm by any one with ordinary mechanical skill. Its combination of levers gives it immense power and its operation is certain.

A suitable frame of timber is secured to the ground or the floor of a building, upon which is mounted a box, A, by being pivoted by a cross brace to the uprights, B, to allow it to take a horizontal or nearly perpendicular position. In the back end of this box, when in a horizontal position, enters a follower, C, which nearly fills its cross section. This is connected by a pivoted bar to the lever beam, D, pivoted to an upright standard at E, and connected by a bar to the traversing lever, F. This lever's weight is sustained by a roller which moves over the segmental platform, G. At the extreme end of the lever is a rope connected by a hook, and winding on an upright windlass or capstan, which may be turned either by manual labor or horse power.



WILLIAMS' HORIZONTAL COTTON PRESS.

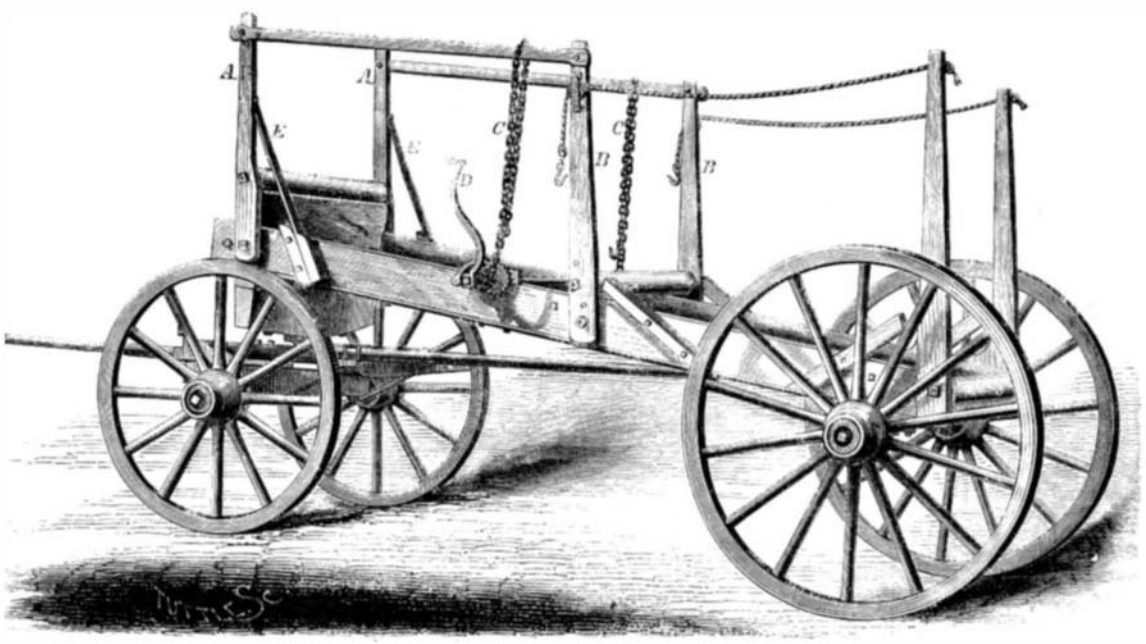
In operation, the box, A, is turned into a nearly perpendicular position and the hay or cotton pressed in until full; it is then swung into a horizontal position and the follower, C, inserted and brought home by the leverage. That portion of the box, A which holds the bale has a hinged top and bottom, the former seen open in the engraving, for convenience in roping or strapping the bale and for delivering it when finished. The windlass on the rear of the machine is for "tumbling" the box, A, which is done by a cord attached to the box and winding on the windlass beam. The top and bottom of the receiver are held in place, when closed, by a double swivel latch and the box is secured when in a horizontal or vertical position by a suitable catch. This apparatus was patented through the Scientific American Patent Agency, Oct. 2, 1866, by John I. Williams of Meridian, Miss.

Comstock's Lumber Wagon Rack.

When drawing lumber on wagons for short distances the labor of loading and unloading takes more time than to convey the load. Two men are necessary to load and to unload; one must be on the team and one on the ground. The employment of a roller near the driver's seat and one at the rear of the wagon at different elevations to give the load a backward incline is often used, but the binding of the load, its unbinding, and discharge still required considerable time and labor.

In the rack represented in the engraving the body of the wagon is inclined by means of bolsters of differing hights, that on the forward end being the highest. The upright stakes are pivoted to the sides of the frame and in them turn the pivots of the rollers. The uprights, A and B, are connected together by pivoted bars at their top so that they move in unison, and the rear uprights may be connected to B by lines which pass over pulleys on B, or through staples, and from these they can be attached to the chains, C, which are intended to be wound up on the shaft forward of the stakes, B, which shaft is turned by the crank, D, and held in position by the ratchet and pawl seen in the engraving. By a forward movement of the uprights, A and B, and backward of the rear stakes the rollers are lifted from the bolsters and allowed to turn free, which assists in the process of loading. This position of the stakes and rollers is assured by hooking the hooks of the lines into the chains, C, and turning the crank, D. This compels the rollers to bear the weight of the load. The diagonally affixed pieces on the sides of the wagon near the middle and rear uprights, prevent them from moving back too far when the rollers are raised. The pivots of the stakes, A and B, are in the rear of those of their respective rollers, and those of the rear stakes are forward of those of that roller. This gives an eccentric motion which insures the raising of the rollers and also their easy seating on the bolsters to prevent their turning.

When the rack is loaded the hooks of the ropes are disconnected from the chains, allowing the rear stakes to be forced back by the load which will bear on the rear bolster at the same time the middle and forward stakes are released, so that the remainder of the weight is taken by the middle and front bolsters, a movement which is aided by the springs, E, bearing against the forward stakes, A. The chains are then passed over the load and one of the hooks passed through a link of the other chain and secured by winding the chain by the crank which is held by the pawl and ratchet. In unloading, the chains, C, and the ropes are connected, and by turning the crank the load is supported on the rollers, which discharge it in a compact pile.



COMSTOCK'S LUMBER WAGON RACK.

By a long test with these devices it is found that half or more of the labor and time is saved than by any other method in use for loading, teaming, and unloading lumber. This improvement was patented through the Scientific American Patent Agency, February 5, 1867, by Charles C. Comstock, Grand Rapids, Mich., whom address for additional facts.

Probing Gun Shot Wounds.

From Dr. V. Gelcich of Los Angeles, Cal., we have received a communication relative to the above subject which is worthy of notice. He says that there is much difficulty in discriminating between bone and the ball by the use of the ordinary probe. His probe is simply a piece of white pine wood, made in the shape of a probe, introduced into the wound, rub, bed against the suspected object, and quickly withdrawn-when, if it has touched the ball, traces of lead will be found upon it. He says, by this simple instrument, while a medical officer in the United States Army, he saved the limbs of two men on whom amputation was about to be performed for gunshot wounds in the lower extremities; what was long supposed to be bone proving to be lead by the aid of the white pine probe.

A porcelain probe has been used to show the presence of lead in the same manner, but it is probable that a softer substance like wood is better. At least where the channel made by the ball is straight, or nearly so, and in many cases where a probe is not at hand, this, which could be extemporized from a bit of wood, would prove extremely valuable. In cases where the ball did not take a direct course it seems as though a piece of pine wood might be secured to the metallic probe and do its office in a superior manner. Dr. Gelcich offers his discovery to the attention of surgeons.

Science and Art in China.

These curious people (the Chinese) are at once remarkably knowing and ignorant. They have, for instance, as wide an acquaintance with *Materia Medica* as we, and perhaps as much knowledge of properties and effects; but they have no reasonably philosophy of treatment and next to no knowledge of pathology, physiology or anatomy. Their physicians think every pulse they find an independent manifestation; having no idea of the circulation of the blood. A physician would undoubtedly be put to death if he attempted to dissect the human body, and surgery is unknown. Prescriptions are potent according to the multitude of ingredients, often from fifty to eighty, which they stew all together and then administer. The blood of any animal is a favorite specific for deficiency in qualities that distinguish that animal. The medical art is merely a trade, in which every man keeps his knowledge and discoveries secret for his own benefit, a condition sufficient of itself to account for its backward and utterly unprogressive state.

A more amusing illustration is the deficiency of this most ingenious people in the art of music, of which they seem to have no idea, and yet they must possess abundance of musical capacity, from the fact that under the circumstances they can be taught a tune at all. A gentleman in Hong Kong is teaching a Chinese class to sing, and has succeeded in creating from it a choir for the Union Church which can sing a simple tune at sight, without error. He thus describes the state of music in the celestial regions:

"I believe this to be almost the first attempt to teach the reading of music to this wonderful people. The Chinese themselves have no tunes and no idea of music. Their instruments can only produce two or three tones, and their singing is screeching in falsetto to no kind of tune. Their voices are harsh to a painful degree, and their talent for flattening wonderful. They must never be asked to go above D, and after half an hour's singing lose all command of their voices. They also incline to bawl."

Trichiniasis.

The scavenger habits of the rat certainly render the contents of his entrails living poison to the viler animal that devours them, and thus a prolific source of trichinæ in swine. A committee of the Vienna Medical Society have made an elaborate report in which they maintain that the disease also originates in the rat; a large percentage of rats examined in different towns and countries having been found trichinized. It is also found that the germs of trichinæ may be conveyed from infected meat to other food by the larvæ of flies; which shows how a rat or other animal may become trichinized without eating either trichinized flesh or intestines containing germs. Prof. Brown, in a lecture before the Society for the advancement of Science and Art, in this city, stated that this parasite originates almost entirely in the swine, and is there invisible to the naked eye. When flesh containing the trichinæ is introduced into the human stomach, the flesh is dissolved and the parasite unloosed from its cell. When this occurs the parasite is about one thirtieth of an inch in length. Birth is then given to trichinæ, which straightway proceed to penetrate the whole muscular and flesh system through the alimentary canal. These young trichinæ are at first only $\frac{1}{5\,4\,0}$ of an inch in length, and resemble a worm in spiral coil. By the time they traverse the system, however, they increase in size many fold, and then begin to make felt that terrible disease to which they have given the name. As first introduced into the animal they cause trouble only by the production of their offspring. The disease is first made apparent by pains in the joints, the head, and the spine, and the patient gradually wastes away and dies. The trichinæ do not create disease by eating away the flesh—which they are not fitted to do—but by hindering or closing up the forces and processes by which health is preserved. From one of the limbs of a girl who had died in this manner lately in Springfield, Mass., a portion of muscle was detached and subjected to microscopic examination. A square inch of this disclosed from 30,000 to 80,000 trichinæ.

Welding Composition.—Fuse borax with one sixteenth its weight sal ammoniac, cool, pulverize, and mix with an equal weight of quicklime, when it is to be sprinkled on the red hot iron and the latter replaced in the fire.