PHOTOGRAPHIC NOTES.

Novel Detective Cameras.—At a recent meeting of the Society of Amateur Photographers in this city, two novel cameras were shown. One, called a vest camera, the invention of Mr. R. D. Gray, consisted of a circular case of metal nicely nickel plated, about seven inches in diameter and two inches thick, divided by a thin blackened metal partition on the inside, having a small truncated aperture cut between the center and its outer edge. Upon the front side of the partition, held in close contact with it by a small pressure spring, was a rotating shutter propelled by a flat coiled steel spring, and provided with four apertures similar in size and shape to that in the partition.

A shaft or spindle passed through the center of the partition, to which the spring of the shutter was attached, and around which the shutter loosely revolved. The end of the spindle passing to the rear of the partition terminated in a disk two inches in diameter, upon which the sensitive plate, cut in the shape of an octagon, rested. A pawl and ratchet wheel just under the disk prevented the spindle from rotating backward, and at the same time served to hold the spring of the shutter to any desired tension.

The front face of the case, carrying a small lens made to imitate a good sized button, slipped over the rim, and was attached thereto by a bayonet joint; through the center projected the front end of the spindle, on the end of which was screwed a small black button, having a slight brass projection at its edge, intended to serve as a guide when rotating the plate, that the operator may know where his first exposure was located.

A simple spring release device for the shutter was arranged on the inside rim of the case, operated by pulling a string which passed to the outside and was long enough to come down under a vest to the waist of the operator.

The back of the case had on its inside, near the center, a flat spring, which, as the back was attached to the rim by a bayonet joint, pressed upon the back of the sensitive plate, holding it face down against the face of the rotating disk, previously mentioned.

A false vest, made of stiff "hatter's" material, had on its rear side a leather pocket, into which the metal case was put, and through special openings (the edges of which were covered with binding), the lens tube and spindle projected. A flat cord passing over the back of the neck suspends the vest in position; and, when the coat is buttoned near the neck, over the false vest, the lens tube appears to be like a button on the coat, and is remarkably deceptive.

To operate the camera, it is only necessary, when opposite and within the proper distance of the object, to pull the string, hanging slightly below the bottom of the vest, which releases the shutter, and makes the exposure, without attracting the attention of any one. The small knob on the front end of the spindle is then rotated to the right until a click is heard inside, which indicates that the sensitive plate has been revolved forward sufficient to receive a new impression, at the same time the coiled spring is wound up equivalent to the amount it was uncoiled when operating the shutter, so that the speed of the latter, though moving continually forward in one direction, will be uniform.

Each plate will receive eight impressions, and when full may be replaced by a fresh plate in the usual dark room. All the images have to be developed together in one solution; and as the exposures have been uniform, the pictures usually develop out equally. The exposure may be made very rapidly, as it is not necessary to operate any plate holder.

We have seen several negatives, and enlargements from the same, made by the apparatus, which were so well done that they fully demonstrated its practicability, and proved it to be a truly detective camera. We should mention that by unscrewing the lens button a certain number of turns, the focus is regulated to suit different distances. Another advantage is that pictures can be secured while in the act of walking, leaving the hands perfectly free.

The other camera referred to was in the shape of a large opera or field glass, shown by Mr. C. Volney King, and arranged for him by Mr. Wm. T. Gregg, of this city. On the small end of one tube was the lens, behind it the shutter, a rotating disk actuated by a coiled flat steel spring, and released by a small trigger, while at the large end was fitted a case to hold the small sensitive plate. The circle of the picture is 2⅛ inches in diameter. In the other tube was a similar lens, but at the large end was a ground glass. The operator, after drawing out the slide of the miniature plate holder, had, in order to take the picture, only to reverse the opera glass, look at the object through the large end, and focus by working the usual central screw with the thumb and middle finger then, when all was ready, press the releasing trigger with the little finger, which made the exposure. When the image was sharp on the ground glass, it would also be on the sensitive plate, as both were in the same plane. It was only necessary to put in a fresh plate to take successive pictures, and these being small were easily carried about in the pocket. The pictures could be enlarged without difficulty, and were the correct size for the magic lantern. Being small, compact, light, and portable, and in the form of an article in common use, the camera possessed many advantages not found in ordinary so-called detective cameras.

To Prevent the Curling of Gelatine Paper Prints.—After the print has been fixed and washed, it is immersed for a few minutes in a five per cent solution of glycerine and water; then removed, and directly squeegeed on a sheet of smooth hard rubber, then left to dry. When pulled off, it will lie as flat as a sheet of glass.

Possibilities of Vessels Communicating with Each Other at Sea.

The number of directions in which experiments are being made with electricity is almost numberless. Prof. Bell, in a recent interview, stated that similar conclusions had been reached by himself and Prof. Trowbridge as to a means of vessels communicating with each other at sea, as follows:

"Most of the passenger steamships have dynamo engines, and are electrically lighted. Suppose, for instance, one of them should trail a wire a mile long, or any length, which is connected with the dynamo engine and electrically charged. The wire would practically have a ground connection by trailing in the water, at least, the result would be the same. Suppose you attach a telephone to the end on board of a ship. Then your dynamo or telephone end would be positive, and the other end of the wire trailing behind would be negative. All of the water about the ship will be positive within a circle whose radius is one-half of the length of the wire. All of the water about the trailing end of the wire will be negative within a circle whose radius is the other half of the wire. If your wire is one mile long, there is then a large area of water about the ship which is affected either positively or negatively by the dynamo engine and the electrically charged wire. It will be impossible for any ship or object to approach within the water so charged in relation to your ship, without the telephone telling the whole story to the listening ear. Now, if a ship coming in this area also has a similar apparatus, the two vessels can communicate with each other by their telephones. If they are enveloped in a fog, they can keep out of each other's way. The ship having the telephone can detect other ships in its track, and keep out of the way in a fog or storm. The matter is so simple that I hope our ocean steamships will experiment with it. The principle is not new; it is old, with a new use waiting for commerce to utilize it. I have experimented on the Potomac, and marveled at the simplicity of the apparatus and the stupendous importance of the results."

Fire Dangers from Steam Pipes and Hot Air Flues.

In the course of a recent lecture by Dr. Tanner before the Louisville Board of Underwriters, the subject of fires caused by steam pipes and hot air flues was discussed at considerable length. In the course of his address, Dr. Tanner spoke as follows:

Mr. James Braidwood, who was for many years chief of the London Fire Brigade, made the startling statement in 1846 that it was his belief that "by long exposure to heat not exceeding 212 deg. timber is brought into such a condition that it will fire without the application of light. The time during which this process will go on until it ends in spontaneous combustion is from eight to ten years, so that a fire might be hatching in a man's premises during the whole time of his lease without making any sign." Among the many instances cited by Mr. Braidwood in support of this statement is one to the effect that a fire in the Bank of England was traced to a stove which was resting on a cast iron plate one inch thick, this in turn resting on concrete two and a half inches thick, which was supported by wooden joists, the joists under the stove igniting. If this is a cause of fire, then the majority of houses heated by means of steam, hot water, and hot air are in constant danger of fire from spontaneous combustion, since the general impression prevails that the pipes and flues for heating can with impunity be placed in contact with timber.

In examining this cause of fires, the first question is whether wood will char at as low a temperature as 212 deg. In tearing down houses for the purpose of rebuilding, the timber in contact with the heating pipes and flues has often been found charred. Charcoal is made for certain purposes in the arts at 300 deg. As the result of experiments performed by myself in the laboratory, small pieces of white pine heated a few hours in an air bath at a temperature of 300 deg. were partially converted into charcoal. Considering these facts, it must be admitted the temperature of 212 deg. is sufficient, if applied for a longtime, to convert wood into a partially burned charcoal. Accepting this as a fact, the next point to consider is the degree of heat at which charcoal will ignite. Made from the same wood at different temperatures, the products ignite accordingly; that is, if made at a low heat, it fires from a correspondingly low temperature. It has been determined experimentally that charcoal for making powder, when made at 500 deg., would fire spontaneously at 680 deg., and when wood has been carbonized at 260 deg., a temperature of 340 deg. only was required for spontaneous ignition. Under certain circumstances, charcoal made at a temperature of 500 deg. even will ignite when heated to 212 deg.

So far the discussion of heating pipes and flues as a cause of spontaneous fires has been upon the false idea that they are never heated beyond 212 deg. Under the ordinary pressure of the atmosphere, as when water is heated in the open air, it boils at 212 deg., but if it is heated under pressure, the boiling temperature increases accordingly; for instance, water boiling at a temperature of 212 deg. is under a pressure 147 pounds, equal to a column of water one inch square and about thirty feet high; if the pressure is increased to two atmospheres, the temperature required will increase to 249 deg., and so on, so that when a steam gauge registers 60 the actual pressure is 75 pounds, and the temperature at which the water is boiling as high as 307 deg. The higher the house, the greater must be the pressure, and hence the higher the temperature at which the water boils, and it follows that the pipes must heat hot accordingly, and it is stated that in some systems of water heating the pipes have the water started through them at a temperature of 350 deg.*

Then, where furnaces are used for heating, the temperature in a flue has been found to be 300 deg., at a distance of fifty feet from the fire. Couple these figures with those given in reference to the heat necessary to produce charcoal and cause its ignition, and it must be admitted that these pipes and flues for heating are responsible for many fires. The application of these facts is as follows: After long exposure, the wood in contact with the heating pipes and flues is changed on the surface to charcoal. During the warm season this charred surface absorbs moisture from the air; then in the fall comes a cold spell and heat is turned on, when the moisture is driven from the pores of the charcoal, leaving it in a condition to readily absorb gases. The cold abates and the heat is lowered; fresh air in abundance then passes into the confined spaces where the pipes are generally placed, rapid absorption of oxygen from the air by the charcoal follows, with heating and spontaneous firing as already explained.

The body of the timber is heated, and this heat prevents too rapid cooling of the charred surface when the fresh air passes in, otherwise the charcoal would be placed under circumstances unfavorable to ignition. The experiment of burning iron filings in the flame of a spirit lamp illustrates the influence of division upon the igniting point; now, if the iron is in a pulverulent state, as when made by hydrogen, it will, when freshly made, ignite to a red heat when shaken into the air. Then, if it is true, as stated by an English scientist, that the oxide of iron, if placed in contact with timber and excluded from the air, and aided by a slightly increased temperature, will part with its oxygen and be converted into very finely divided particles of metallic iron, here is another cause of fires from heating pipes. For during the summer the pipes rust, and then when heated the rust is reduced, leaving the metallic iron in the same condition as that made by hydrogen; the temperature is lowered, fresh air appears, and oxygen is rapidly taken up by the finely divided iron, each particle heating so rapidly as to give a red heat to the mass.

I have not been able to prove this experimentally; but as carbon is able to overcome quite strong chemical affinities, and will reduce the oxide under strong heat, theoretically it is possible, and the authorities all tend to prove it. Considering all the points bearing upon hot water and steam pipes, also heating flues, an explanation is found of the great number of fires occurring at the approach of winter, and which are reported as from defective flues, supposed incendiary origin, or causes unknown. Steam pipes packed in sawdust or shavings to retain the heat while steam is conveyed to a distance have given fires. One peculiar and important instance is on record of a fire from steam pipes. In the drying room of a woolen mill, a pine board was placed some three or four inches above the steam pipes to prevent wool from falling upon them. A fire followed, and after being put out, a careful examination determined to the satisfaction of all, that the heat of the pipes had distilled the pitch from several knots in the pine board, and this dropping on the pipes had ignited and caused the fire. The illustration needs no comment, as the lesson is too plain to need pointing out.

EVERY ONE has a cure for sore throat, but simple remedies appear to be most effectual. Salt and water is used by many as a gargle, but a little alum and honey dissolved in sage tea is better. An application of cloths wrung out of hot water and applied to the neck, changing as often as they begin to cool, has the most potency for removing inflammation of anything we ever tried. It should be kept up for a number of hours; during the evening is the usually most convenient time for applying this remedy.

* By the system of low pressure steam heating, which is far the most generally used, the pressure is only from 5 to 7 pounds above that of the atmosphere, with a corresponding temperature of 228 deg. to 235 deg. F.

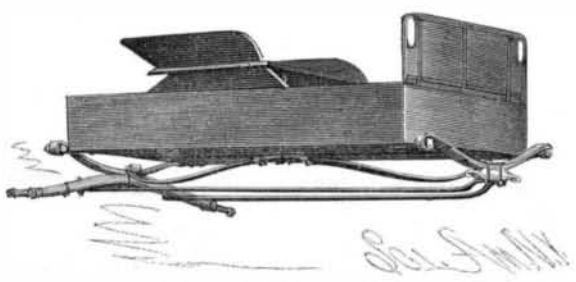
Safety Railway Couplings.

The Amalgamated Society of Railway Servants has invited all owners and inventors of improved safety railway carriage or wagon couplings to communicate with its secretary at the rooms of the Society, 306 City Road, London, E. C., with a view of giving their inventions a practical trial in actual service. The sum of £500 has been set aside by the Society for this purpose. The desirability of such an action is shown by the statistics of the past few years. During the year 1884, 130 persons in Great Britain were killed while shunting cars, and 1,305 were injured. During the seven years preceding 1885, the yearly average of accidents gave 154 killed and 1,322 injured from this cause. In the United States, 459 men were killed in the same manner during 1884.

It is estimated that one man is killed here for each 765,000 freight-train miles, while in England the record is somewhat better, being one man to each 1,010,000 miles. Our readers are familiar with the effort of the Master Car Builders' Association in attempting to decide upon the best coupler among the many good ones of American inventions, and their desire to have it uniformly adopted on all American roads. The problem is somewhat less complicated in England on account of the uniformity of the central drawbar and chain, but it is stated that no satisfactory substitute for the simple hand coupler now in use has yet been invented.

VEHICLE SPRING.

Clips hold the front spring and the front ends of the perches connected with the rear axle to the head block, the nuts of the clips being in recesses in the bottom edges of the block; the rear spring is secured to the center of the axle in the usual manner. The ends of these



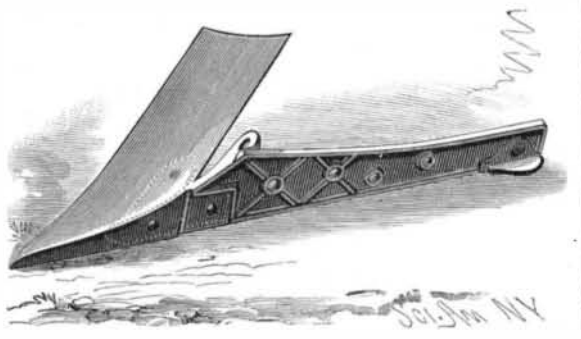
CAIN'S VEHICLE SPRING.

springs are pivotally connected at their outer ends with the four corners of the vehicle body. Longitudinally along the center of the under side of the body is attached a strip or sill, to which the thicker inner ends of brace springs are secured. These springs extend to the ends of the box, and their outer ends are curved and fastened to bolts held on the ends of inwardly and upwardly projecting prongs, held on the head block by the clips and the king bolt, and on the rear axle by clips. The center of the body is thus supported from the front and rear axles. The vehicle rides very easily and gently, as the several springs co-operate, and no side bars, side springs, nor spring bars are required.

This invention has been patented by Mr. Cornelius H. Cain, of 1223 Olive Street, St. Louis, Mo.

IMPROVED PLOW.

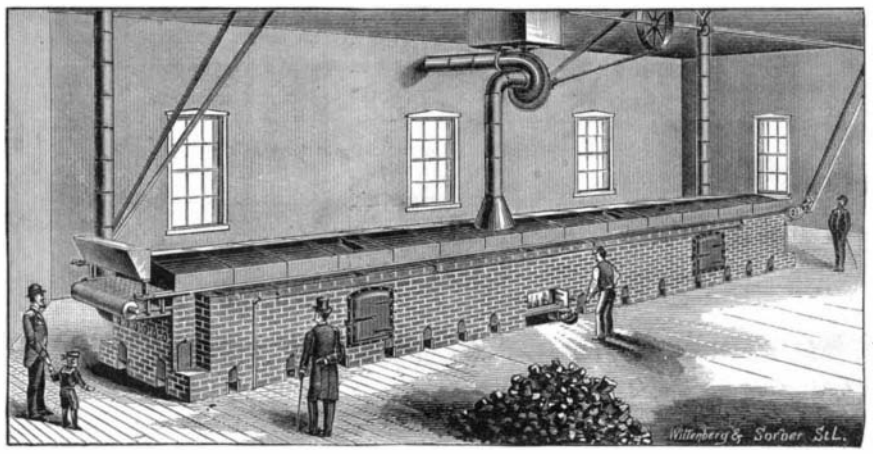
The share is formed solid with the short landside, and fits into a recess in the lower forward part of the extension or long landside. This extension is strengthened and stiffened by flanges and ribs, as shown in the engraving, and is formed with holes that receive the bolts for fastening the landside plate in position; this construction allows the extension to be made lighter than would otherwise be practicable, and at the same time provides a secure and firm support for the plate. Upon



HODGSON'S IMPROVED PLOW.

the inner forward part of the landside are lugs (shown by the full and dotted lines), that receive the bolts holding the share and mouldboard in place; these lugs allow the share and mouldboard to be fitted into place more easily than would be possible if a solid frog or dead lay were used. The lug can be so formed that the same landside can be used with either a single shim or double shim mouldboard. The heel is secured to the landside by a bolt passing through two parallel lugs projecting upward from the middle part, the landside entering between the lugs. The projecting side parts of the heel are made narrower at their outer ends, and the narrow end of the outside one is placed forward. The outer part of the heel is forced into the soil at the base of the shoulder of the furrow, thereby giving steadiness to the plow. When one side becomes worn, the heel can be detached and reversed. If desired, the lugs can be extended, and connected at their ends to form an open welded or cast frog, to be used instead of a solid frog or dead lay when applied to a steel, cast iron, or wrought iron landside.

This plow is the invention of Mr. W. H. Hodgson, Gen. Mgr. of the Winona Plow Co., of Winona, Minn.



WORRELL'S "WEB" DRIER.

IMPROVED DRIER FOR DAMP GRAIN, GLUCOSE, STARCH, ETC.

We herewith illustrate a new invention for drying starch and glucose refuse, brewers' grains, distillery slops, and substances of a similar character, which, from their glutinous nature, have not heretofore been successfully operated upon by existing drying machines. It is also well adapted for handling damp grain and granulated tobacco. The main feature is an endless web or belt of galvanized wire cloth drawn over two large rollers, one journaled at each end of the machine. The edges of this web are sustained by iron plates, which also prevent the escape of hot air at the sides. A number of "idlers" are also provided for supporting the wire cloth and material being dried. The furnace is underneath the drying belt, the firebox being in the middle, and from each side of this extend a number of cast iron heating pipes, that discharge into a soot box at each end of the drier. The entire heating apparatus is covered by dust shields. The brickwork around the furnace prevents the loss of heat by radiation, and furnishes a substantial support for the running gear. Numerous small gates are placed in the bottom of this wall for regulating the distribution of the air currents. The furnace presents a large amount of heating surfaces, means for producing a regular radiation of heat, and easy access for cleaning purposes. Any kind of fuel can be used.

The top of the machine is a close-fitting sheet iron cover, to which is connected the suction spout of a powerful exhaust fan, seen in the top of the cut, to accelerate the upward movement of the hot air, which is the sole drying agent. Drain pipes are supplied for disposing of the condensed water that collects on the interior of the iron cover. Motion is transmitted to the drying web by worm gearing, shown at the extreme right.

In operation, the damp material is spread to an even thickness across the entire width of the upper wire cloth by a sifting device in the bottom of the hopper, at the left of the cut. This action leaves the substance to be dried in a loose, porous condition, so that the air can freely pass through it. By the movement of the web the material is now carried into the machine, where the heat brings the moisture to the surfaces of the particles, and it is absorbed by the air and carried up and discharged through the blower. This action is continued until the material reaches the opposite end of the machine, where it is discharged in a thoroughly dry condition. A revolving brush under the delivery roller removes any particles that may adhere to the wire cloth.

This invention has been patented by Mr. Stanley E. Worrell, of Hannibal, Mo.

POWDERED rice is said to have a great effect in stopping bleeding from fresh wounds.

Ships' Signals.

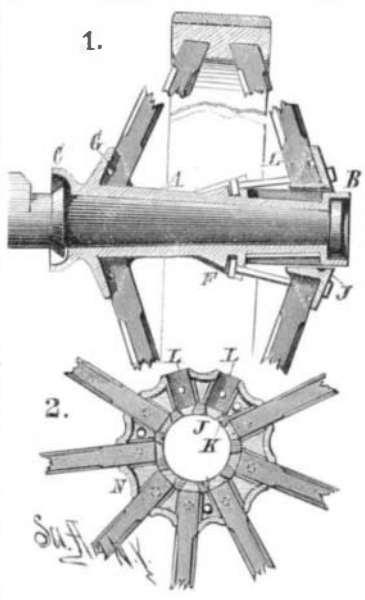
Mr. Donald C. Grant, one of the Forth Bridge staff, according to the *Engineer*, is bringing out a new form of signal for use at sea to indicate to other ships the direction of movement of the helm, so as to avoid collision with ships close up. He does not propose to supersede the side lights at present employed, but only to supplement them. The officer on watch is supplied with a couple of signals small enough to be carried in a breast coat-pocket of ordinary capacity.

Should he wish to indicate that his vessel is on the port tack, he takes a signal—with a round handle and colored red—from his pocket, and fires it by giving it a slight tap. The result is a brilliant red light.

After this light has burned for about 30 seconds, it explodes a small maroon, the report of which can be heard a mile off, and after this the light continues to burn for another 30 seconds. The process of firing the starboard tack signal is, of course, the same, the result being a green light, but in this case the handle is square, this difference of form making it easy in the dark to distinguish the right signal to be employed.

VEHICLE WHEEL.

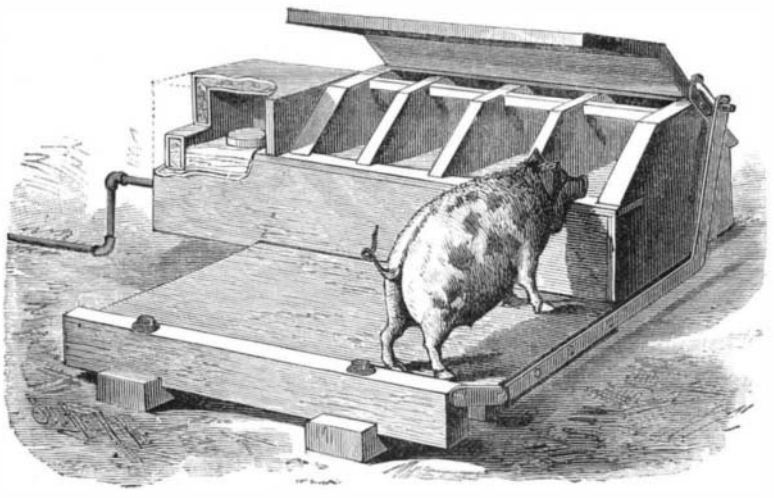
Fig. 1 is a cross sectional elevation, and Fig. 2 is a front view, of the front ring of a vehicle wheel invented by Mr. Henry B. Weinstock, of Fall Creek, Wis. On the front and rear ends of the tapered hub-thimble,



A, are the sand guard flanges, B, C. Cast on the thimble a short distance from the front end is a ring or lug, F; and at the rear end is a ring of pockets, G, provided with pins and open toward the front. Fitting on the front end of the thimble is the ring, J, formed with three longitudinal grooves, K, in its inner side for receiving tapered keys cast on the thimble. This ring has as many pockets as there are pockets, G, on the thimble. The ends of the rear spokes are placed in the pockets, G, the pins passing into the outer faces of the spokes, and the ends of the front spokes are placed in the pockets in the ring, the pins entering their outer edges. The outer ends of the spokes are mortised in a wide felly. The ring, J, is held by bolts, the heads of which are held in recessed lugs on the thimble, as shown clearly in Fig. 1. This construction forms a strong and durable wheel.

AN AUTOMATIC AND NON-FREEZING STOCK WATERING TROUGH.

Farmers and stock raisers will find, in the contrivance for watering stock herewith illustrated, a construction calculated to save time and trouble, promote cleanliness, prevent waste of water, and yet always perform the service required. The platform in front of the trough is arranged to have an up and down movement, and is so connected by short rods, and a crank rod and crank arms, with the cover that when the hog or other animal steps upon it the cover will be



BOIES' STOCK WATERING TROUGH.