A CONVENIENT CAMERA.

BY GEO. M. HOPKINS.

While it may be too early to say the old-time plate-holder camera has had its day, it cannot be denied that magazine cameras of various kinds are superseding the old-fashioned camera, especially among tourists and others who desire to accomplish a great deal photographically in a very short time. The magazine camera is in photography what the Gatling gun is in warfare. It enables the operator to not only secure a great number of subjects, but it often allows him to get a view which would be lost if the plates were to be changed by the clumsy device of the ordinary plate holder.

The low price and good quality of plates and cut films contribute in no small degree to the success and popularity of the magazine camera. There is, however, still a bar to its very general use; that is the high price at which these instruments have been held. As their construction has been somewhat complicated, and as good workmanship is necessary to insure accuracy and reliability, the cost of manufacture has been so great as to warrant existing prices.

The engraving represents a magazine camera which is reliable in its action, and at the same time so simple that its construction is quite within the range of the amateur or ordinary mechanic.

A plate holder or kit is required for each plate or film. The holder consists of a hard wood frame a little larger—inside measurement—than the plate or the film holder, with a piece of thin veneer glued to the back. The upper edge of each holder is beveled on the front, while the lower edge is beveled on the rear, as shown in Fig. 3. Two washers or burs let into the upper part of the frame project into the space which receives the plate, and in a recess in the lower part of the frame is pivoted a button which, when turned transversely, holds the lower edge of the plate in the holder. In the face of the holder at the upper corners are formed notches for receiving the nibs of the hooks which are used for changing the plates.

The camera box is divided by a vertical partition into two compartments. In the front compartment is located the lens and shutter, while the rear compartment is subdivided into two similar chambers by a horizontal partition, which extends toward the vertical, leaving a space which is sufficient to allow the holder lying in contact with the vertical partition to be transferred from the upper chamber to the lower one.

To the rear end of the camera box—which is removable—is attached a pair of pillow springs, which hold the plate holders in the two chambers in contact with the vertical partition. To the end of each spring is attached a follower, which bears against the plate holders. The upper follower has square edges all around; the upper edge of the lower follower is beveled in the same manner as the plate holders.

The vertical partition has opposite the lens a rectangular opening, through which the plate is exposed, and in the vertical partition are formed grooves about three-sixteenths inch deep and wide. In the bottom of the box, opposite these grooves, are formed mortises, for receiving the U-shaped shifting rod, which slides in the grooves. The upper ends of these rods are reduced in thickness, and bent rearward slightly to cause the nibs at the ends of the bar to enter the notches in the upper corners of the holder. After the first plate is exposed, the shifting rod is pulled down, thus carrying the plate holder from the upper chamber downward into the lower chamber, in front of the follower, which is forced backward by the engagement of the beveled lower edge of the plate holder with the beveled upper edge of the follower. After the second exposure, the plate holder is drawn down in front of the first plate holder, and so on.

It will be seen that the magazine may be made for any number of plates.

The lens in the camera illustrated is a wide angle achromatic of short focus. It is fixed at such a distance from the plate as will enable it to cut a clear, sharp image at a distance of eight feet. No focusing mechanism is provided, as it is found that better results can be secured in a camera of this kind by having the lens in a fixed position. The lens tube is provided with a r volving diaphragm located between the lenses.

Lenses of this kind, suitable for hand cameras, can be purchased from the dealers with or without a shutter. A very simple and efficient shutter is shown in Fig. 4. It is inserted in slots formed in the lens tube, behind and very near the diaphragm. The narrow end of the plate, A, forming the fixed portion of the shutter is provided with ears, *c c*, which act as guides for the slide, B. A clip, *e*, placed on the lower end of the plate, A, guides the lower end of the slide, B. It is held in place by a lip on the lower end of the plate, A. The plate and the slide are each provided with a circular opening a little larger than the largest aperture of the diaphragm.

To the plate, A, is pivoted a spring-pressed trigger, *d*, which engages the notches in the edge of the slide, B. One end of the spring, F, is inserted in the plate, A, the other end being attached to the slide, B. The

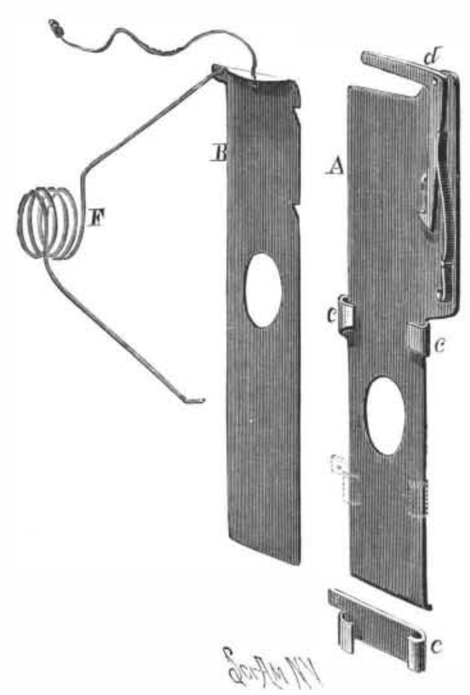
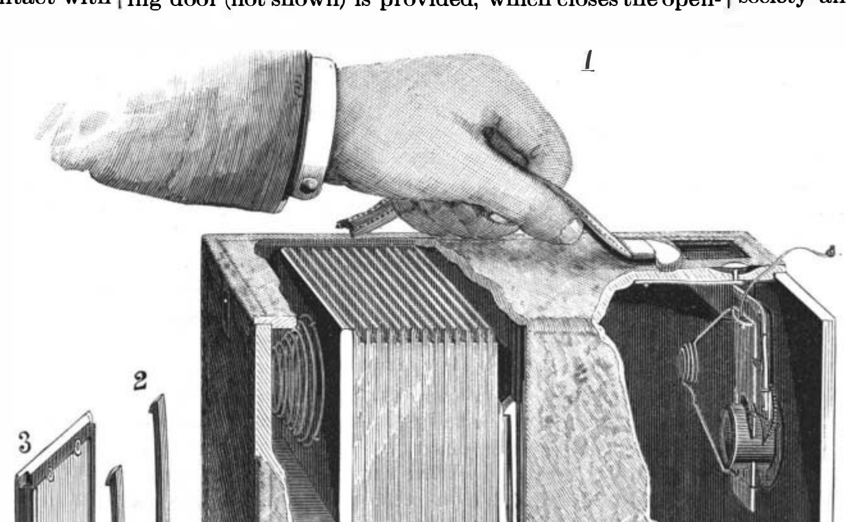


Fig. 4.—THE SHUTTER.

upper end of the slide, B, is bent over and perforated to receive a stout string, which extends through the top of the camera and is used for setting the shutter.

To the inner surface of the camera top is attached a flat spring, the free end of which projects over the horizontal arm of the trigger, *d*, and is provided with a button extending through the camera top. By pressing this button the trigger is operated and the slide, B, is released. As the slide is carried downward by the spring the holes in the slide and plate, A, coincide for an instant, thus making the exposure. To change the diaphragm it is necessary to open the front of the camera. To prevent the exposure of the plate a swinging door (not shown) is provided, which closes the opening in the vertical partition, preventing the access of light to the plate. For time exposures the shutter is set open by catching the trigger in the middle notch and using the cap. The speed of the shutter is varied by using springs of different strength.



MAGAZINE HAND CAMERA.

A CHEMIST advises that canned fruit be opened an hour or two before it is used. It is far richer after the oxygen of the air has been restored to it.

India Rubber in Chewing Gum.

A great many false statements have been made as to the composition of ordinary chewing gum. Of course where spruce gum is used, every one knows what the basis of it is, and the article is sold to-day pure and in good quality at from 50 cents to $1.50 per pound. Most of this gum is gathered in the Green Mountain regions of Vermont, and is sold through the West, as other kinds are more popular on the Atlantic seaboard. The gum, however, that is sold from candy stands and in drug stores to-day is of totally different origin and as a rule it is a manufactured product. To a certain extent this is a secret, as all India rubber compounds are secret to ordinary observers. What is known as Yucatan gum is made of gum chicle, sugar and a variety of flavors, with certain ingredients which are kept secret, but help to make a homogeneous mass. The flavors that are used are peppermint, wintergreen, licorice, pineapple, and some few medicinal ingredients.

Experts in chewing gum manufacture can tell in a minute whether good flavors are used, whether the best gum is incorporated, and just what the quality of the compound is, but in order to tell this accurately they are obliged to test it by chewing. The gum has a certain quality of sugar added to it to sweeten and make it palatable. It will be noticed that in chewing gum, after it has been in the mouth awhile, the sugar and flavor is entirely gone, and what remains is the rubber-like product, which is the chicle gum nearly pure. This gum is the sap of a Mexican tree which is called sapodilla. It grows in other countries besides Mexico, but that is the only country where a business is made of tapping it. It is collected like India rubber sap, by cutting incisions in the bark, between the months of November and April, and after the gum has been gathered, it is packed in sacks, 200 pounds to the sack. It is then a light-colored mass that appears to be about half way between gutta percha and India rubber. In the factories it is washed, dried and mixed much as India rubber is, only it needs no process of vulcanization, and when run off on the spreaders is cut into sticks, wrapped and packed ready for shipment. Within a few years the industry has assumed large proportions and the demand for it seems to be growing every day. This is the only part of the rubber business that seems to have no dull season, as one part of the year is just as good as another and chewers want their gum in winter as well as summer. It is a mistake to think that only shop girls and ignorant people chew gum, as the habit has invaded all classes of society and many physicians recommend it highly.

Tobacco chewers who are trying to give up their habit often take to chewing gum and find it of help to them. It is a curious fact that in England they do not chew gum but rather look down upon the habit as being vulgar, and of the small quantities that have been shipped abroad, but little has been sold. The time doubtless will come, however, when this democratic habit will overcome the prejudices of our cousins across the water, and when the Prince of Wales will be seen with a quid of American gum in his mouth, chewing it with as much gusto as a Bowery boy. Already Australia has thrown up her hands, and decided that gum is a necessity, and American manufacturers are working that market for all it is worth.—*India Rubber World.*

Photographing Colors.

M. Lippmann, Paris, recently admitted to the Academie some photographs of colored objects which are a decided improvement on the earlier ones. The films he employs are of albumeno-bromide of silver rendered orthochromatic by azalin and cyanin. With these he has obtained brilliant photographs of the solar spectrum after an exposure of 5 to 30 seconds. On two of these plates the colors when seen by light coming through the plate are complementary to those given by light reflected from the plate. Theory indicates that compound colors should be photographed as well as simple ones by his method, and one of his plates is a view of a stained glass window of four colors—red, green, blue, yellow; others show a group of flags, a party-colored paroquet, and a plate of oranges, with a poppy lying on the top. The shades of the objects as well as their colors are faithfully reproduced. The flags and bird were taken in five to ten minutes by means of electric or sun light, the others only after many hours of exposure to diffused light. The green of leaves and the gray tints of a stone building are also given on another plate; but the blue of the sky comes out an indigo hue. M. Lippmann is now engaged in perfecting the orthochromatism of the plate.

Gun Cotton.*

Perhaps no other formula given in the United States Pharmacopœia has proved so unsatisfactory in results in the hands of the majority of pharmacists as the one given for making gun cotton. What the result would be has always been an uncertainty with even the most careful and experienced manipulators. Sometimes the fiber would appear unaffected after long exposure to the action of the acids. Again, it would disappear entirely, having been dissolved without so much as coloring the mixture. Still again, it would, under apparently similar conditions, assume a hard, granular structure, being insoluble, and equally as disappointing as if it had disappeared altogether. Sometimes success would crown the careful effort. So uncertain, however, have been the results that by far the largest number of pharmacists have entirely abandoned the practice of preparing their gun cotton. This practice may be well enough from a commercial point of view, but is not up to the present standard of intelligent pharmacy.

Having occasion to prepare this article frequently and in considerable quantities, we began some two years ago a series of careful experiments with the view of arriving at something like certainty and uniformity in its manufacture. We made, in all, thirty-six experiments, and what we have to offer is the result of the most careful observations taken during these experiments. We have tried every formula we could find in print and followed up every suggestion and hint we could find, as given by those who have experimented before. We have used mixtures of sulphuric acid and nitric acid, sulphuric acid and nitrates, acids of different degrees of concentration and in different proportions were tried, etc., but we soon came to the conclusion that the difficulty did not all reside in the strength of the oxidizing agents nor in the relative proportions in which they were exhibited.

The process by sulphuric acid and a nitrate we abandoned as objectionable in every way. It is very offensive, tedious, inelegant and too expensive for practical use. We also soon found that our acid mixture might be of correct proportions and of proper strength, and still failure result from other causes. Not only must the acid mixture be of sufficient strength and correct proportions, but the temperature must be just right; the cotton must be free from grease and perfectly dry; it must be introduced into the acids in a proper manner; taken out at the right time, washed and dried as it should be, if success is to be assured every time. To neglect any of these points is to invite failure; to observe them all is to insure success.

Before beginning this paper we prepared eleven samples by the instructions given below; all were readily soluble in the U. S. P. mixture of alcohol and ether and each one yielded a brilliant limpid collodion of very superior quality. We found by repeated tests that five ounces prepared by this process would make as much collodion as eight ounces prepared according to the instructions given in the Pharmacopœia.

We used a mixture consisting of twelve parts of concentrated sulphuric acid, six parts of concentrated nitric acid, and one part of absorbent cotton. In working with these proportions observe closely the following directions: Pour the sulphuric acid into an open stone jar in which the nitric acid has previously been placed. When the temperature has fallen to about 35° C., place the jar in a larger vessel and surround it with broken ice. Allow the temperature to fall to 15° C. Then take the cotton, a small portion at a time, and, having carefully loosened up any compact masses, lay it carefully on the surface of the acid and with a clean glass rod press it below the surface. Keep the thermometer in the acid and watch the temperature closely. Continue the additions of cotton until all is under the acid. If at any time the temperature rises above 16·5° or 17° C. stop the additions of cotton till the thermometer registers 15° again. Allow the jar to remain in the ice without cover for about five hours. Now drain off as much of the acid as possible, using a glass rod to press it out. When, as near as possible, all the acid has been removed, protect the hands with rubber gloves and take up the cotton in small portions and wash it quickly in a large vessel of cold water. As soon as the cotton reaches the water, move it about quickly and pull it apart to prevent too great an elevation of temperature. Wash in several portions of cold water. Wring out well and spread on clean boards or paper to dry.

Do not rinse in hot water or dry by artificial heat. You will greatly injure, if not completely spoil, your product if you do. We have spoiled several fairly good samples by placing in hot water. As soon as dry, the cotton is ready for use, and if the above directions have been observed faithfully, it will be all that can be desired. If any portion is to be kept for future use, place it in an open jar and cover with distilled water. Cover the jar loosely. Do not keep it in a tightly closed container; it will make trouble.

The U. S. Pharmacopœia is very faulty in the matter of temperature. We proved to our perfect satisfaction that anything above 17° C. will always be injurious and often disastrous. The proportion of nitric acid prescribed in the Pharmacopœia is much too large for good results. If the temperature be kept down as indicated above, the same acid mixture may be used repeatedly. We have used it successfully four times.

For nearly a year we have been working by the above process, sometimes preparing five pounds at a time, and have always had perfect success. By using the acids several times over, the cost is materially reduced. The offensive fumes that are given off when a nitrate is used are avoided. A cotton with strong fiber is secured and a brilliant collodion of superior quality obtained.

* By J. G. Flint, Ph.G., Decatur, Ill., in the *Western Druggist*.

Dr. Adams' Electric Express.

Dr. Wellington Adams, like his namesake the Duke, appears to be a gentleman to whom immense undertakings are congenial. He has evolved a good big one in his Chicago and St. Louis Electric Railway scheme. His exposition of his ideas before the New York Electric Club left an appreciative audience in the state of mind which follows a conjuror's explanation of a difficult trick, as Professor Forbes expressed it. The discussion which followed the lecture was meager, owing to the lack of details regarding Dr. Adams' electric motor, which he said he could not divulge for patent reasons. It would have been extremely interesting to have had these details and to have heard such eminent authorities as Professor Forbes and Mr. O. T. Crosby discuss them. Dr. Adams presented several ingenious devices, his method of suspending the trolley wire being notably so and capable, probably, of general adaptation.

It seemed to be the prevailing opinion that the construction of such a road in six months is practically impossible. And yet they have a way of doing things in the West when they start out to do them.

Dr. Adams stated that 30,000,000 visitors were expected at the fair, and that he counted on 3,000,000 of them riding to St. Louis and back on his road out of curiosity. Let's see. The fair will last six months. This means that Dr. Adams will have to carry over 16,500 passengers per day. His cars hold 40 passengers each. He will need a rolling stock equipment of over 400 cars. According to the doctor's figures, the through passenger traffic between Chicago and St. Louis over all the existing steam roads amounts to but 1,200 per day. Would the doctor's railway be a sufficiently big curiosity to increase the passenger traffic from 1,200 to 16,500 per day?

This element of time is a troublesome thing. The Thomson-Houston Electric Company has recently contracted with the Baltimore and Ohio Railroad to furnish three electric locomotives, and they require a year's time to fill the order in.

Dr. Adams says that the advocates of big schemes are known as cranks and that he is proud to be known as a crank. We have remarked before in these columns that it is the cranks which make the world go. Dr. Adams is a daring projector, an enthusiastic believer in himself and an earnest advocate of his purpose. The lack of important details of this novel scheme permits the skepticism of practical men.—*Electrical Review.*

Diseases of the Malta Orange.

The insects with two membraneous wings known as Dipterans offer to the study of the naturalist various families with a prodigious number of species, many of which infest man in his dwelling, such as mosquitoes and flies, while others torment domestic animals, as the tick, which is found on sheep and cows, and the gadfly on cattle.

Several of these insects are likewise pernicious to the vegetable kingdom, consuming leaves, flowers, and fruits.

The peach, cherry, and olive, besides other trees, are specially attacked by flies, the larvæ of which devour their fruits; thus proving very detrimental to the cultivators of fruit trees.

The orange trees, especially the mandarines, are attacked by a lively, small fly known to zoologists for the last sixty-three years. This fly seems to have first visited Malta about fifteen years ago, since which time it has gradually increased in number, causing damages which, during the last three years, have become most serious.

This insect belongs to the "Ceratitis," as classified by McLeay, in the year 1829.

Men who claim the right of priority call this species "Ceratitis Capitata." Weidmann, a few years before, described the same Diptera as "Tephritis Capitata." However, the insect still continues to be known by English entomologists as "Ceratitis Citriperda," as thus designated by McLeay.

This species has for a long time been confused with the "Ceratitis Hispanica," which is found on the coast of the Mediterranean. But notwithstanding its being looked upon by some as a variety of the same, it is still an entirely different species.

With a view of studying the biology of this Diptera, the late Sir Henry Torrens named a committee, in 1889, under the presidency of the late Major-General Hales Wilkie, who, having made inquiries and studied the metamorphosis of the insects, and placed himself in communication with distinguished foreign professors, deemed it his duty to make known to the public what he and the committee learned relative to the insect in question from both a technical and practical point of view.

Biology.—The fly presents a sexual dimorphism which consists in the male having two club-shaped projections on the forehead.

It is very lively and hardy, so much so that when kept without food under a glass shade, it maintained its energy for twelve days. The female flies perforate the rind of fruits and deposit their eggs therein, from which in a few days appear the larvæ; these, destroying the pulp of the fruit, cause it to fall to the ground, where it soon decays.

The spot perforated is indicated by a dark stain, in the center of which may be observed a small hole. This admits the air necessary for the respiration of the larvæ, and through it the latter pass out when they cannot find other ways. These openings in the fruit cause it to rot.

The female insect prefers to lay its eggs on the side of the fruit most exposed to the sun, because these insects display their fullest energy under the influence of the direct rays of the sun.

The larvæ form their cocoons under ground, but one of the members of the committee, Mr. Alfonso Micallef, has observed in his garden cocoons in the chinks of walls. This shows that the larvæ go there to undergo the metamorphosis in chrysalis.

We have not been able so far to ascertain how many generations are produced during the year, but it is certainly more than one.

The wings of this insect are semi-transparent, with about sixteen brown and yellowish spots. Its claws are yellow, the head is of various colors, the breast speckled and the belly dark yellow. We have thought proper to give this brief description in order to refer the reader to that of the renowned Professor Penzig, of Genoa, at page 472 of his work entitled "Studi Bottanici sugli agrumi e sulle piante affini" (Roma, Tipografia Eredi Botta, 1887).

Means proposed by the professors consulted and by the committee.

In order to rid gardens of this destructive insect, which not only consumes acid fruits but also peaches, medlars, etc., at present scarce in the market on account of this insect, it was proposed by some to gather the infected fruit and destroy it by burning. But Major-General Hales Wilkie suggested a plan which he himself had tried in his own garden. This consists of collecting all fallen fruit before the maggots had time to come forth and bury themselves in the soil, and placing it in tanks of water, where a mash might be made that afterward might be utilized as manure.

The placing the fruit thus pounded in a pit dug in the garden and covering it with quicklime is highly recommended. The caustic property of the quicklime kills the larvæ.

The president had each fruit wrapped in a muslin bag, which was also found to be most efficacious.

The buried fruit in due course decays, and the contents of the pits form a rich accumulation of fertilizing substances of no little value to agriculture.

Two things should, however, be observed if the desired effect is to be realized.

First, the collection of the fruit should not be limited to the acid species, such as oranges and lemons, but should be extended to peaches, pears, apples, nectarines, etc., attacked by the *Ceratitis citriperda.*

Secondly, it would be necessary for all cultivators to adopt the same treatment, since should a single orchard or fruit grove infested by this insect be unattended to, it would immediately become the center of constant infection to all the neighboring gardens, and all the labor bestowed on the others would be thus thrown away.—*The Mediterranean Naturalist.*

Action of Light on Sulphite of Silver.

In a recent number of the *Chemical News*, Mr. W. H. Sodean relates some experiments with regard to this action of light which have a decided photographic interest. The salt was prepared by passing sulphurous anhydride into a solution of recrystallized nitrate of silver, washing the precipitate thoroughly, and completely desiccating by keeping it in a vacuum over a mixture of sulphuric and chromic acids. When kept in hermetically closed tubes it was slightly blackened after a fortnight's exposure to sunlight. When the temperature was raised, the blackening was more intense and more quickly brought about. It was noted also that when moisture was present, the darkening was accelerated. This latter effect might be anticipated, for it is well known that many familiar gaseous reactions are absolutely impossible when the gases before mixing and the containing vessels have been rendered perfectly free from water vapor. Quite recently, for example, it has been shown that sulphureted hydrogen gas, so fatal to silver prints and injurious to silver articles, is quite without action upon silver and other salts when quite dry.