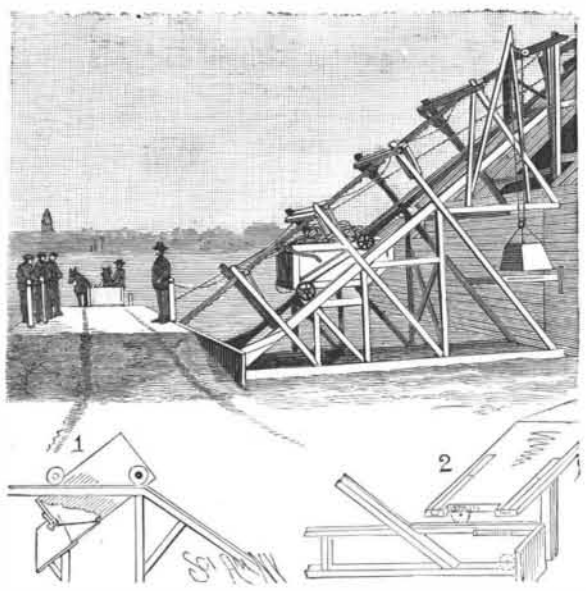
AN INCLINE ELEVATOR AND DUMP.

This improvement comprises a derrick of simple but strong construction, forming inclined tracks, on which travels a car having wheels in different planes, there being at one end a low down dump where the car receives its load, and the contents of the car being automatically discharged into a chute at the upper end of the incline. The invention has been patented by Mr. Samuel E. Kurtz, of Greenfield, Iowa. The large view shows the application of the improvement, Fig. 1 representing the car dumping its load, and Fig. 2 the bottom of the incline, where the load is received, below the level of a dumping platform, upon which a loaded wagon may be readily driven. At the bottom of the inclined tracks are upper and lower parallel tracks, the upper tracks being narrower than the lower ones, and the car comes to a level at the point where it receives its load, as the rear wheels run down to the lower



KURTZ'S ELEVATOR AND DUMP.

tracks without striking the upper tracks. The car is drawn up by a cable passing around a pulley on a cross bar at the upper end of the tracks, thence back and around a pulley on the car, and again around a pulley on the cross bar, from which the cable leads over guide pulleys to a point convenient for attachment to a whiffletree or the axle of a wagon, so that the team bringing the load may furnish the power by which it is elevated and dumped. At the front lower corner of the car is a downwardly swinging door with end flanges overlapping the sides of the car, and adapted to drop into connection with a chute delivering to the desired receptacle in the usual way. The door is held normally closed by gravity catches, which are automatically released when the car is pulled up to its limit, the door being automatically closed again as the car rolls backward. A counterweight is arranged to prevent the too rapid descent of the car, and a rack is also arranged in the framework and a pawl and ratchet on the car. This elevator is very inexpensive to build, costs nothing for power, and is designed to be especially useful to farmers and others for elevating materials into storage bins and for similar purposes.

POLISHING AND BUFFING LATHE.

The lathe shown in the illustration is designed for heavy work. It has extra long babbited boxes, giving the spindle sufficient bearing to insure stiffness. The width of head is reduced to facilitate work upon large irregular pieces, and it is especially adapted for bicycle, stove, chandelier or car trimmings work, permitting the use of a large wheel without jar or spring. The lathe is made in several sizes, with detachable steel taper ends in the next lower size to take the smallest brush or buff. They are designed to be run at a higher speed than any in the market. They are made by the Hanson & Van Winkle Company, of Newark, N. J.

Money Value of Hands and Fingers.

The following estimate of the relative value of the hands and of the several fingers is taken from the *British Medical Journal:* According to a scale drawn up for the Miners' Union and Miners' Accident Insurance Companies, of Germany, the loss of both hands is valued at 100 per cent, or the whole ability to earn a living. Losing the right hand depreciates the value of an individual as a worker 70 to 80 per cent, while the loss of the left hand represents from 60 to 70 per cent of the earnings of both hands. The thumb is reckoned to be worth from 20 to 30 per cent of the earnings. The first finger of the right hand is valued at from 14 to 18 per cent, that of the left hand at from 8 to 13·5 per cent. The middle finger is worth from 10 to 16 per cent. The third finger is valued at no more than 7 to 9 per cent. The little finger is worth 9 to 12 per cent. The difference in the percentages is occasioned by the difference in the trade, the first finger being, for instance, more valuable to a writer than to a digger.—*Food.*

Railway Rates in India.

In the United States we are apt to consider our railroad rates as lower than those of other countries, and this is probably true of freight, but in passenger rates the Indian railroads go far below ours. The government report on Indian railroads for the year ending March 31, 1893, which has lately been issued, gives the average rate on all freight at 1·023 cent per ton mile; our rate for 1892-93, according to the Interstate Commerce Commission reports, was 0·898 cent. Our average on passenger business, however, was 2·126 cents per passenger mile, while the Indian railroads charged only 0·645 cent. This rate was in silver, but it must be remembered that wages and other charges are paid in silver also, though imported machinery must be paid for in gold at a premium. The lowest average rate was found on the Madras Railway; it was 0·414 cent per passenger mile. This rate would give fares in this country of about 37 cents from New York to Philadelphia, 99 cents from New York to Boston, about $3.75 from New York to Chicago, and about $14 from New York to San Francisco.

These low rates are made both possible and profitable by the dense native population which furnishes the railroads with an enormous number of passengers who are satisfied with the cheapest kind of accommodations, provided the charge is low. Over 95 per cent of the passengers are carried in the fourth-class cars, which are used only by the natives, and hardly 1 per cent use the first-class. While in this country the average passenger train load is 42 persons, on all the Indian roads it was last year 231, or over five times as large, while in one case—the East Indian Railway—the average was 247 persons.—*Eng. and Min. Jour.*

Smoke Prevention.

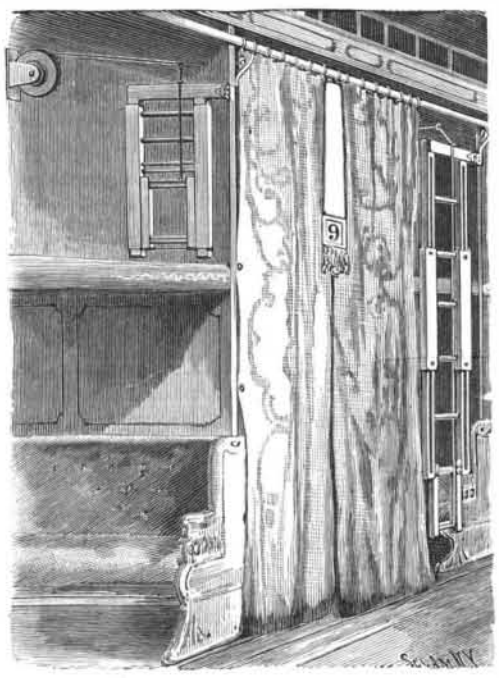
In a recent experiment at Glasgow, Scotland, *Engineering Mechanics* says the coal used showed 31·40 per cent gas, tar, etc., 48·70 per cent fixed carbon, 0·84 per cent sulphur, 6·56 per cent ash, and 12·50 per cent water. Before treatment analysis showed that the products of combustion contained 5·8 grains of sulphuric acid per 100 cubic feet, and after treatment 2·8, while in another case the reduction was from 9·5 to 4·2. As to soot, the first test showed a decrease from 73·5 grains to 2, and the other test from 23·3 to 1·5 grains. In other words, from 94 to 97 per cent of the soot was removed and fully a half of the sulphuric acid. Tests showed that the draught was not affected, being 5 inches in the flue and 4 inches in the chimney.

A Babcock & Wilcox boiler was used, driving a 220 horse power engine, and consuming 3 tons of coal and a ½ ton of scraps and chips. Before entering the usual chimney the gases ascend a short brick flue, and then descend a flue of steel plates dipped at a high temperature in a tar composition, entering the ordinary stack at the bottom. At the bottom of the ascending flue is a jet of steam at boiler temperature, while at the top of the descending flue is a fine spray of water. The carbon is thus separated, and, with the water, drops into a sump at the foot of the descending flue, being thence carried off in pipes.

POLISHING AND BUFFING LATHE.

AN EXTENSION LADDER FOR SLEEPING CARS.

How inconvenient it som times is, especially for the aged and the feeble, to reach the upper berth in a sleeping car, has often been noticed by travelers on our railways. To obviate such inconvenience, and enable the traveler to readily get into the upper berth and descend therefrom, is the object of the improvement shown in the illustration, which consists of an extension ladder adapted to be folded and swung out of the way when not in use. It has been patented by Mr. John B. Holbrook, D. K. E. House, Ithaca, N. Y. Upon the usual removable transverse partition separating the upper berths from each other is a hinge connected with an arm or bar forming the upper end of the ladder, which is made in sections adapted



HOLBROOK'S EXTENSION LADDER FOR SLEEPING CARS.

to slide upon each other. When swung outward the ladder drops down nearly to the car floor, just outside the lower berth. To facilitate folding the ladder, a tape extends from the lower rung of the bottom section up through the several sections, passing through an eye to a spring-pressed drum fixed within convenient reach. By pulling on this tape the occupant of the upper berth can readily fold the ladder, which is then swung inward against the side of the partition. When the car is made up in the morning, the partition board is stored with the ladder attached.

High Railway Speeds.

High speeds on railways formed the subject of the inaugural address of M. Du Bosquet, president of the French Society of Civil Engineers. He states that the reason speeds are not maintained on the level is because the engines are not sufficiently powerful for this. Some experiences with the dynamometer made with speeds from 37 to 75 miles, and of which the results have been extended to greater speeds, show that for the same motive force of 17·2 lb. per ton, a train reaches a speed of 75 miles on a decline of one-half of one per cent, 57 miles on the level and 31 miles on an incline of one-half of 1 per cent. To increase the average speed by a small amount, the power of the engines must be much greater. If 800 horse power is sufficient to draw a train at 75 miles an hour up an incline of one-half of 1 per cent, 2,960 horse power will be required to draw the same train up the grade at a speed of 125 miles per hour. In high speeds the weight of the engine per horse power generated is important, as there is always a limiting speed beyond which the engine cannot draw itself, let alone a train. Really high speeds, the speaker stated, will be obtained only by diminishing the weight, per horse power, of the locomotive, and by limiting the load to be hauled to a minimum.—*Railway Engineering and Mechanics.*

Protection against Serpent Bites.

Dr. Calmette is continuing, at the Pasteur Institute, a series of interesting experiments on the poison of serpents commenced by him while residing in Cochin China. He has obtained excellent preservative effects by inoculating or injecting viper's blood in various animals. He treats it first by heat or by chemical agents, such as hyposulphite of soda. His theory is that venomous animals are unaffected by their own poison. His results confirm those recently obtained by MM. Phisalix and Bertrand at the laboratories of physiology and chemistry at the Paris Museum.

Egypt in the Time of Moses.

We are only beginning to understand the height of civilization to which Egypt and other ancient countries around the Mediterranean had attained even before the time of Moses, says Sir John William Dawson, in the *Expositor*. Maspero and Tomkins have illustrated the extent and accuracy of the geographical knowledge of the Egyptians of this period. The latter closes a paper on this subject with the following words:

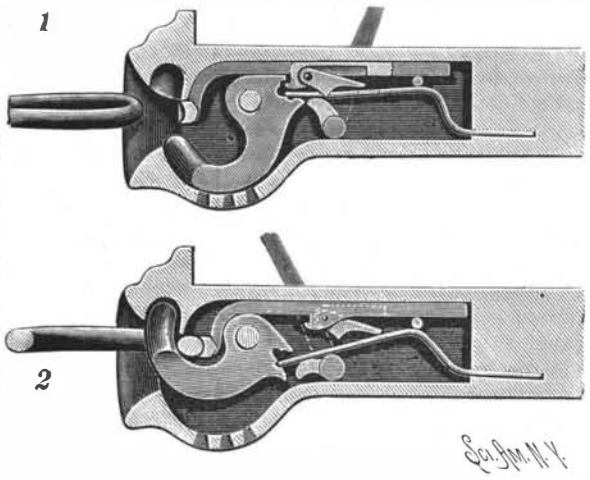
"The Egyptians, dwelling in their green, warm river-course, and on the watered levels of their Fayoum and Delta, were yet a very enterprising people, full of curiosity, literary, scientific in method, admirable delineators of nature, skilled surveyors, makers of maps, trained and methodical administrators of domestic and foreign affairs, kept alert by the movements of their great river, and by the necessities of commerce, which forced them to the Syrian forests for their building timber, and to Kush and Pun for their precious furniture woods and ivory, to say nothing of incense, aromatics, cosmetics, asphalt, exotic plants, and pet and strange animals, with a hundred other needful things."

The heads copied by Petrie, from Egyptian tombs, show that the physical features of all the people inhabiting the surrounding countries, as well as their manners, industries, and arts, were well known to the Egyptians. The papers of Lockyer have shown that long before the Mosaic age the dwellers by the Euphrates and the Nile had mapped out the heavens, ascertained the movements of the moon and planets, established the zodiacal signs, discriminated the poles of the ecliptic and the equator, ascertained the law of eclipses and the precession of the equinoxes, and, in fact, had worked out all the astronomical data which can be learned by observation, and had applied them to practical uses. Lockyer would even ask us to trace this knowledge as far back as 6,000 years B. C., or into the post-glacial or antediluvian period; but, however this may be, astronomy was a very old science in the time of Moses, and it is quite unnecessary to postulate a late date for the references to the heavens in Genesis or Job. In geodesy and allied arts, also, the Egyptians had long before this time attained to a perfection never since excelled, so that our best instruments can detect no errors in very old measurements and levelings. The arts of architecture, metallurgy, and weaving had attained to the highest development; civilization and irrigation, with their consequent agriculture and cattle breeding, were old and well understood arts; and how much of science and practical sagacity is needed for regulating the distribution of Nile water, any one may learn who will refer to the reports of Sir Colin Scott Moncrieff and his assistants. Sculpture and painting in the age of Moses had attained their acme, and were falling into conventional styles. Law and the acts of government had become fixed and settled. Theology and morals, and the doctrine of rewards and punishments had been elaborated into complex systems. Ample material existed for history, not only in monuments and temple inscriptions, but in detailed writings on papyrus. Egypt has left a wealth of records of this kind, unsurpassed by any nation, and very much of these belongs to the time before Moses; while, as Birch has truly said, the Egyptian historical texts are, "in most instances, contemporaneous with the events they record, and written and executed under public control."

There was also abundance of poetical and imaginative literature, and treatises on medicine and other useful arts. At the court of Pharaoh, correspondence was carried on with all parts of the civilized world, in many languages, and in various forms of writing, including that of Egypt itself, that of Chaldea, and probably also the alphabetical writing afterward used by the Hebrews, Phenicians, and Greeks, but which seems to have originated at a very early period among the Mineans, or Punites, of South Arabia. Educations were carried on in institutions of various grades, from ordinary schools to universities. In the latter, we are told, were professors or "mystery teachers" of astronomy, geography, mining, theology, history, and languages, as well as many of the higher technical arts.

AN IMPROVED CAR COUPLING.

This coupling has a spring-pressed hook to engage the link, and a slide for locking the hook in open position, the slide being adapted to be engaged by the entering link. The construction is very simple, the cars fitted with this improvement being automatically coupled as they come together, while the uncoupling



DUNLAP'S CAR COUPLING.

may be conveniently effected without the need of trainmen going between the cars. The invention has been patented by Mr. William Dunlap, of San Diego, Cal. Fig. 1 is a sectional view showing the hook in open position, and in Fig. 2 the link is engaged by the closed hook. The hook has trunnions journaled in the sides of the drawhead, and its rear end has a lip pressed on by the end of a spring, which may be lifted by a cam on a transverse shaft connected with a rod, at whose outer end is a handle at the side of the car. On the same end of the hook is also a second lip, above the first one, adapted to be engaged by a hook on the under side of a slide, whereby the coupling hook may be locked in open position. The forward end of the slide is bent down, and has a head or cross-piece extending into the mouth of the drawhead, above the free end of the coupling hook, so that an entering link will strike the head of the slide and move it rearward, disengaging the coupling hook, and permitting the spring to swing the hook upward to engage the link. On the slide is pivoted a dog whose free end rests on top of the spring, and on the under side of the dog is a lug passing through a slot in the spring, the lug being adapted to be engaged by the cam actuated by the handle lever, whereby the slide may be moved forward to lock the coupling hook in open position. A notch in the rear end of the hook is also adapted to be engaged by the end of the spring to lock the hook in closed position, the spring being disengaged from this notch by swinging the cam upward by means of the handle lever. Further particulars of this improvement may be obtained of Mr. E. M. Reinhardt, C Street, between 26th and 27th Streets, San Diego, Cal.

Prizes for Hay and Clover Making Machines.

In connection with the Darlington meeting of the Royal Agricultural Society of England for 1895 the following prizes are offered by the Royal Agricultural Society of England for: Class I.—For the best hay making machines, first prize, $100; second prize, $50. Class II.—For the best clover making machines, first prize, $100; second prize, $50. All prizes are open to general competition. The trials will take place during the hay harvest of 1895, on land selected by the society in the neighborhood of Darlington. The necessary arrangement for the grass and clover crops required for the trials will be made by the society. Notice of the place and date of the trials will be posted to every competitor as soon as they are fixed. Every competitor must himself provide for the delivery of his machines on the trial ground, and for the removal of the same after the trials. Horses will be provided by the society to work the machines during the trials, but competitors who desire it may provide their own horses. Every machine must be delivered at the depot on the trial fields in proper working order not less than two days previous to the commencement of the trials. The competitor will find one attendant to drive and work each machine. Any assistance given by the competitor himself or other workman will be noted by the judges. The order in which the several machines will be tested will be determined by the stewards, who will decide by lot. Machines are not to be worked under conditions as to weather and crop when such machines would not be used in the actual work of a farm. The attention of the judges and engineer will be particularly directed to the following matters: Price; weight; simplicity, strength, and construction; efficient protection of the gearing, and freedom of the machine from choking; excellence of work in turning and lightening up of the crop without damaging it; draught in work. Should the judges find any of the machines to be of practically equal merit, they are empowered to bracket them as equal, and so divide the prize money. Entries for the prizes in any of these classes must be made on or before Monday, April 1, 1895, and must be accompanied by a deposit of $5 for each entry.

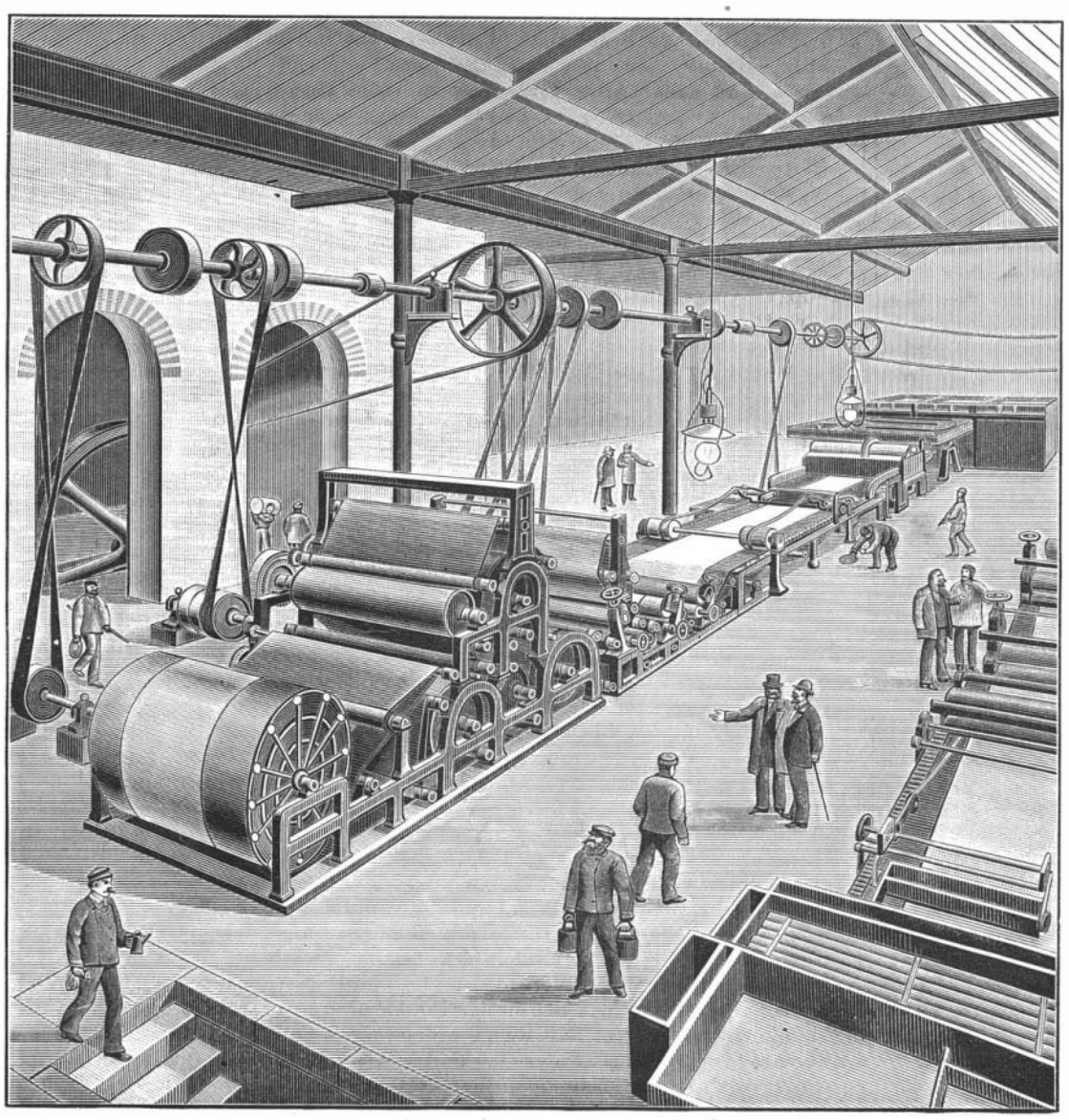
CIGARETTE PAPER.

Cigarette paper is a superior article, presenting numerous qualities. Good cigarette paper should be very thin, very uniform as to pulp, and very strong and resistant. It ought not to become disintegrated when it is slightly wet; in burning it should leave but a small quantity of ashes, and not give out a disagreeable odor; and, finally, in burning, it should not disengage substances injurious to the health.

Superior cigarette paper is manufactured exclusively from linen rags. It weighs 9½, 10 and 15 grammes per square meter. In burning it emits no odor.

Ordinary cigarette paper is manufactured from substitutes. Its pulp often contains a certain amount of wood pulp, especially the paper designed for export. Such paper is heavier and weighs from 12 to 20 grammes to the square meter. In burning, it may emit a slight odor, because the wood pulp contains resin, the combustion of which disengages gases offensive to the smell. In reality, the odor is perceptible only in paper containing large proportions of wood pulp. Apart from that, the quantity of resin contained in the paper is so small that the combustion always proceeds nearly without odor.

In its broad lines, the manufacture of cigarette paper does not differ from that of ordinary fine paper. A single point is special, and that is the finishing, which has to take a long time and be well done. The pulp must be finished slowly, progressively, and with as short fibers as



BUROT'S CONTINUOUS CIGARETTE PAPER MACHINE.