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Raking Attachment for Harvesters.

The object of the improvement shown in the engraving is to clear the platform of the harvester and lay the grain in winrows convenient for binding into sheaves. The harvester proper, does not differ essentially from others, the principle of action and the mode of construction being similar to the harvester in general use; but the prominent feature of this implement is a device for raking the grain from the platform. This appliance, although working automatically by the motion of the machine, is entirely under the control of the driver, who by means of a brake operated by the foot can instantly stop or start it.

The rake has a bar projecting from the semicircular box on the side opposite the driver's seat at an angle, the bar being furnished with teeth of unequal length to suit the angle. At the inner end, the rake bar turns in a journal attached to a radial frame which is pivoted on a vertical shaft. A bevel gear revolves loosely on the rake shaft, the hub of which turns against a collar secured to the rake shaft. This bevel gear meshes into a beveled toothed segment fixed to the frame, so that when it traverses on the face of the segment it receives a rotary motion. The vertical shaft has also a bevel quadrant gear engaging with a quadrant gear secured to a horizontal shaft actuated by a crank on the shaft of the main driving wheel. On the rake shaft is a collar-clutch which works by friction.

The operation of the rake is as follows: As the harvester moves over the field the crank on the driving shaft gives motion to the quadrant gear on the horizontal shaft, which gives motion to the rake arm, swinging it around from the point furthest from the driver's seat to the opening nearest his position. While performing this quarter revolution the teeth of the rake fit closely to the platform. After this partial revolution is effected the rake starts back again, performing half a revolution horizontally, the teeth coming into position at the end of its traverse, ready to take the gathered grain and sweep it off the back of the harvester. Although the action of this semi-revolving and sweeping rake is produced by the driving machinery, it is controlled, as before mentioned, by a brake operated by the driver's foot, so that he can rake off and deposit the load according to his judgment.

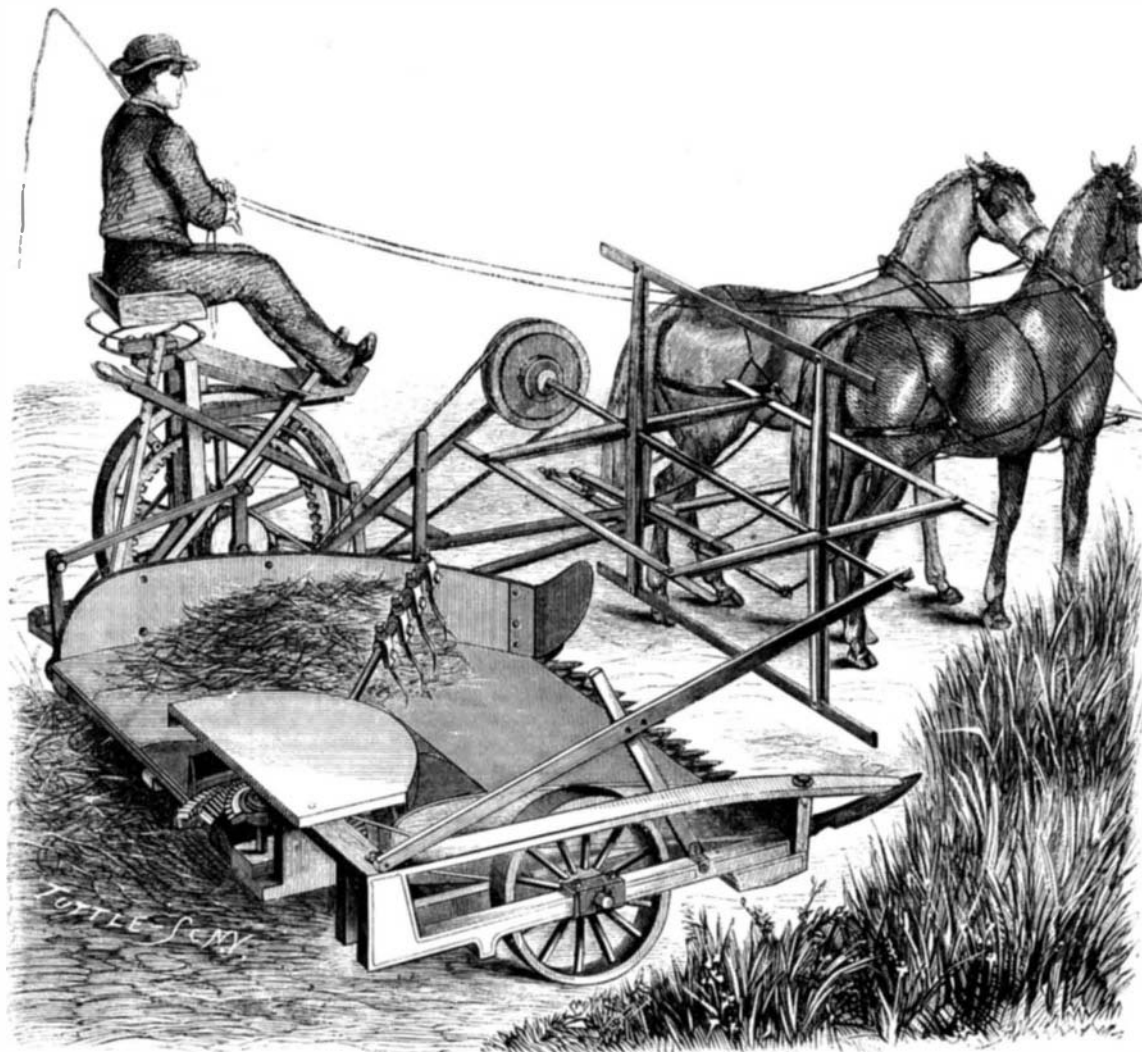
This improvement in harvesters was patented Feb. 9, 1864, through the Scientific American Patent Agency. Address for facts relating to the sale of rights, etc., Harrison & McGaughey, Saint Anthony, Minn.

Improved Car Truck.

The breaking of a car axle is always a misfortune, and not unfrequently is the cause of a catastrophe which is fatal to life and greatly injurious to property. The intention of the improvement herewith represented is to diminish the danger to such accidents and to give increased facilities for turning curves. It is intended also for supporting the trucks and retaining them in position if an axle should break, and for guiding the trucks if a flange of a wheel should break.

Let A be the bottom frame of a car to which the trucks are pivoted at B. The axles of the wheels each have four bearings or boxes, two on the outside and two on the inside of the wheels. They are shown by the dotted lines on the bars, C, in Fig. 1. It will be seen that each wheel is supported in

such a manner that if the axle should break in the central portion or on the outside of the wheel, the wheel will be kept in position and therefore cannot run off the track. To the under side of the car frame are secured four pendant long loops, in which are linked smaller loops attached to the frame of the truck at front and rear. They are seen by the dotted lines on D, Fig. 1, and at E, Fig. 2. These loops serve as supports for the truck in case of accident, enabling the trucks to keep the track and also preventing serious consequences.



McGAUGHEY'S RAKING ATTACHMENT FOR HARVESTERS.

The bars, F, are pivoted at their ends to the trucks, crossing each other diagonally. They unite the two trucks so that one may be a guide for the other in rounding a curve if the flange of a wheel should break, while they do not interfere with the free and independent action of the trucks when running under ordinary circumstances. Thus the co-operation of the

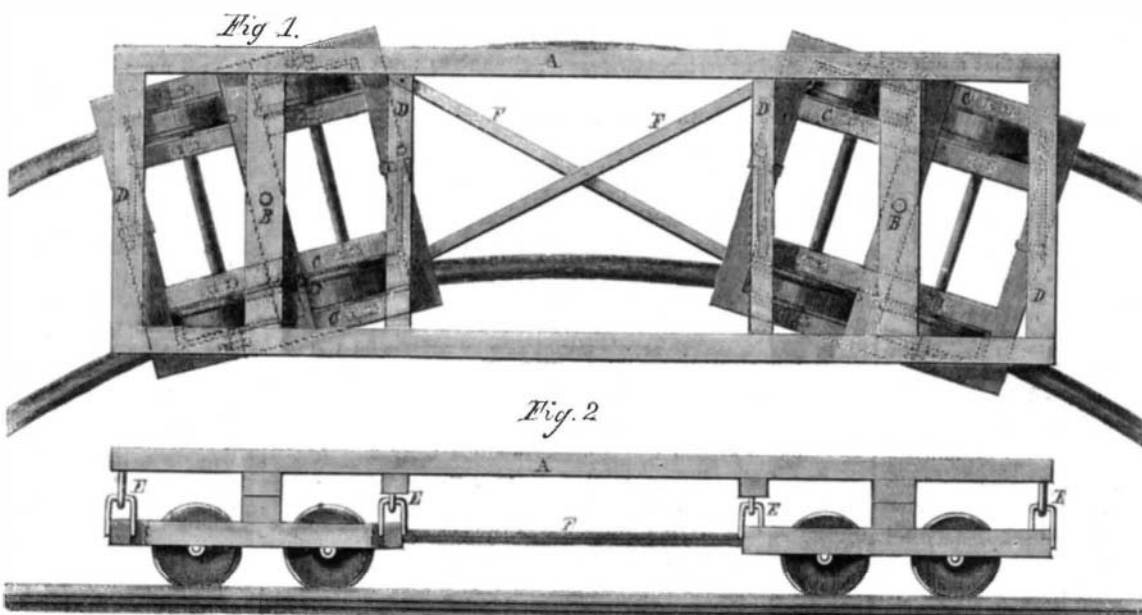
rapidly pass into disuse.

Monkeys in the Cotton Fields.

A cotton planter from Georgia gave his experience, some time ago, in the Galveston (Texas) News, on training monkey's for picking cotton. He writes that in 1849 he owned a cotton plantation in Georgia, and that having occasion to visit the Island of Trinidad, he was persuaded to buy twenty-three monkeys, at a round price, to test their latent capacities for cotton picking. The letter adds:—

"I was mighty well pleased when I received my monkeys. Their arrival turned my plantation topsy-turvey. For two weeks nothing was done by whites or blacks but play with the monkeys. The overseer got one of the brightest looking, and remained at his house most of the time watching the monkey's tricks, and I must confess that my wife, myself and children were in the same business. Seeing this would not pay, I began making preparations to go to work. I had reckoned on one negro managing ten monkeys, and five monkeys picking as much as three negroes.

For the next two weeks, all hands, whites and blacks were engaged in the cotton fields, teaching monkeys. The result was somewhat different from my calculations. Instead of one negro managing ten monkeys, etc., it took ten negroes to manage one monkey, and then the monkey did not pick a pound or an ounce of cotton. I became disgusted, gave all



HEIDERICH'S CAR TRUCK.

two trucks is assured. Those interested in railroad matters can obtain any additional information desired by addressing the patentee, B. Heiderich, Brady's Bend, Pa.

The improvement was patented through the Scientific American Patent Agency on the 13th day of November, 1866.

my neighbors that would accept a monkey, and about a fortnight since sold the last eight to a traveling menagerie at \$5 a piece. My monkey speculation has thrown me behind six weeks in cotton picking. The next time I go to Trinidad I don't believe I shall want any monkeys."

[From our Foreign Correspondent.]

THE BRITISH POSTAL SYSTEM.

MANCHESTER, March 9, 1867.

CONTRASTS OF BRITISH AND AMERICAN GENIUS.

To one whose views are not so narrow as to insist that all that is good in any respect is centered in his own immediate circle of acquaintance, and who is not on the other hand so affected as to despise what is familiar or homely, there can hardly be a pleasanter exercise than in comparing the peculiar genius which characterizes two such nations as England and America. Sprung originally from the same stock, speaking the same language, and addicted in the main to the same pursuits, there is nevertheless a difference in the character of the two peoples so marked as to be apparent to the most unreflecting. This is shown in nothing more clearly than in the varied channels in which the inventive faculty of the two nations has chiefly run, and the direction in which the greatest progress has been made on either side of the water.

BRITISH INVENTION GRASPS AT POWER.

England is *par excellence* the nation of wealth, and this not in any great degree from its titled land proprietors, but from its far more important class of merchant princes. The one idea pervading all her action is the extension of commerce both at home and abroad, and the importance of any thing that may be proposed is judged of according as it tends to promote this object. Let it be shown that a greater facility of communication for mercantile purposes may be obtained by a given innovation, and they will assuredly take the lead of all other nations in introducing it, though it require an expenditure of millions of money. The government appears to understand and share fully the feeling of the people, and considers it its duty to further what will tend to fulfill these demands. And furthermore, as what is done is meant for use and for continual use, it must be well done. Other things meet with less encouragement. If any great increase of personal comfort or domestic convenience can be forcibly shown to result from any improvement, it is very likely that an Englishman will sometime adopt it, but he will probably not make haste to do so, nor will he turn aside to investigate beforehand what it may be likely to accomplish. Such things he is quite willing to allow everybody else to experiment with before him: when they have reached a good result he will begin to take some notice of them.

AMERICAN INVENTION PERFECTS COMFORT.

In America the case is as nearly as possible the reverse of all this. True there are plenty of men deeply absorbed in business, and interested in any thing which tends to promote its interests, but as a rule they have not the means to carry out any very extensive undertakings. The magnitude of the country renders the difficulty so much the greater, and to maintain railway communication over such great distances it is necessary that roads should be constructed with the least possible outlay. As for governmental encouragement—well I don't think I need say anything about that, for our representatives are so much occupied with looking after the welfare of the country that they of course cannot attend to any such matters as these. Necessity is the mother of invention, and it is this which has given our countrymen a world-wide reputation for ingenuity such as is possessed by no other people. The very fact of our having to construct cheap and primitive railways has compelled us to design locomotives which would adapt themselves to them, as experience in Canada has abundantly shown that rigid English engines are totally useless on American roads. We accordingly find a great variety of devices brought out in the American locomotive which render it a machine most admirably adapted to its work, and of late years most of these have been more or less adopted in England.

But again, the American not being brought up in entire dependence on servants, is quite familiar with most of the details of household affairs, and knowing in many cases that much of the burden of such matters must be borne by his wife, he sets himself to lighten that load as far as may be by manifold ingenious contrivances to lessen labor and hasten results. Exposed to severe cold in winter and oppressive heat in summer, he builds his house so as to shield him from either extreme, and then finds numberless appliances which he can introduce into it to make it a comfortable abode for himself and family. And so we might continue to illustrate how the apparently unfavorable circumstances in which he is placed and the entire dependence which he is obliged to place upon himself have made him thorough master of all that tends to make him comfortable and to lighten domestic labor. It is in America therefore that we should naturally expect such great and useful inventions as sewing machines, clothes wringers, cooking stoves, hot-air furnaces, sleeping cars, luxurious steamboats, and the host of similar appliances which are so frequently and well illustrated in the pages of the *SCIENTIFIC AMERICAN*; nor is it but a step further to such as steam fire engines, breech-loading rifles and the like.

SUPERIORITY OF BRITISH POSTAL CONVENIENCES.

But I have already occupied more space than I intended with this comparison. What I wished to do was to give an illustration of some of the commercial facilities which are provided in England, as it is in such matters that we can learn most from them, and that I take it is the object of all comparison. I have already in former letters spoken of the conveniences of underground, and especially *above-ground* railways, and very much more might be said without any danger of exhausting the subject or unduly lauding it. I think, how-

ever, that a few remarks on the *mail service* may be quite as interesting and the subject hardly less important.

HOW NOT TO DO IT—HOW TO DO IT.

To those who have dropped a letter addressed to a Broadway firm into the box at one of the up-town lamp posts on Monday and had it safely delivered at its destination as early as Wednesday of the same week, having perhaps in the mean time called in person at the house for which it was intended, the advantages of the system existing in London may perhaps be appreciable. There are some six or eight collections and deliveries during the day, and the officials there seem to think it as well, when they have received a letter for a city address, to deliver it the next time the postman goes his round. Accordingly if you post your billet at eleven in the morning your friend will no doubt receive it before three, and probably in that way you will have saved a day in the accomplishment of your business. To facilitate city collection and distribution it is usual to have two boxes side by side, one marked in red letters, "For London and twelve miles around," and the other in black, "Inland, Colonial and Foreign Mails." Should you by mistake, however, drop your letter into the wrong box, it will make no difference except that perhaps it may not be delivered till the next morning instead of in the afternoon. The carriers all wear a simple and convenient uniform, and this I think a very good thing if only for appearance's sake, since it is proper that government officials intrusted with valuable property should be distinguished by some mark of their business.

THE GREAT UNIVERSAL NIGHT MAIL.

For the provincial towns there are mails during the day, but the principal one is at night, and this is the one which especially deserves our notice and (would that it might be) our imitation. The train leaves London at 8:40 P. M., before which hour it may be presumed most business letters will be ready for dispatch. After the regular closing of the mail another box is open at the general, and at one of the branch offices, in which letters bearing an extra penny stamp can be posted up to the time the mail actually leaves the office; and after this letters with two extra stamps may be posted in the traveling post-office at the railway station till the time of its departure. The train is one provided expressly for the service and called the "Limited Mail," from the fact that only a limited number of passengers are taken. Seats may be secured in advance, but ordinary tickets are not available unless there happens to be room in the carriages. For the purpose of seeing the operation of this, I made the journey between London and Glasgow by this train a short time since. The distance is 400 miles, and the through time less than 10½ hours, out of which about one hour is consumed by thirteen stops. The average speed, therefore, for the whole distance (a part of the way being over heavy gradients) is considerably over 40 miles an hour, and it frequently rises to nearly or quite 60. The "Limited Mail" forms a trunk from which branch off, at certain stations along the line, mails for all the provincial towns, so that not only do the merchants in Glasgow and Edinburgh find their letters, written after business hours in London the previous evening, awaiting them on their arrival at their offices, but the same is true in every other city and town in the country. A similar train leaves Glasgow somewhat earlier in the evening and reaches London at a little before 5 A. M., the running time being the same, and this starting with a single carriage and post-office, receives the contributions of all the towns as it passes along till it reaches London with all the affairs of the nation on its shoulders. The traveling post-office vans are well arranged for the work of assorting the letters for the various branch lines. The sides are lined with boxes labeled with the names of all the principal towns, and into these the clerks rapidly distribute the mail as they are whirled along on their nocturnal course.

This service is undertaken by the London and Northwestern Railway, and it has been accomplished at no little expense. They are of course compensated by the government, as the number of passengers is much too small to defray the expenses of the train and all attendance that it is necessary to provide for at the various points along the route. It will be seen how well adapted Mr. Ramsbottom's water troughs are for facilitating such a service, as the engines are obliged to carry but very little dead weight in the form of water, having it ready beneath them at short intervals to be scooped up without stopping.

The same attention to the requirements of the public extends through the other branches of the post-office, the dead letter office, etc. While delay in the transmission of a letter is a rare occurrence, the actual loss of one is still less frequent. In short, the arrangements throughout are such as one would expect to find in a nation with whom, as correctly stated in the first part of my letter, business is the first and great thing.

A very interesting article might also be written on the telegraph companies, which, though not under government supervision in the same way as the postal service, are still very similar to that in their extensive and business-like operations. And another system which deserves much more notice than the few closing lines of a letter, is that for the carriage and delivery of parcels. Instead of this being done through the agency of express companies, the railways themselves undertake it, and this is attended with great convenience to the public. There are offices at numerous points in the cities at which, or at the stations, parcels may be left for dispatch, and the railway companies have their own wagons and attend to the safe delivery themselves, the charge being but trifling.

SLADE.

A POWERFUL LOCOMOTIVE is now building at Bordentown for the Camden and Amboy Railroad. It is a ten-wheel engine with six 4½-foot drivers, intended for coal traffic, and calculated to draw the heaviest coal trains unaided.

Heliography, or Sun-Engraving,

Mr. Charles Nègre of Avignon described his beautiful process of chemical steel engraving before the Photographic Society of Paris, at the last meeting reported in our foreign exchanges of March 1st. The steel plate is first coated with a varnish of some soluble substance mixed with bichromate of potash, which has the property of becoming fixed, or insoluble in water, by the action of light. This coating is then exposed to the wrong side of the negative obtained directly in the camera, and the light transmitted through the light portions of the negative fixes the varnish, while the dark parts leave it soluble so far as covered by them. The soluble portion of the varnish being washed off, the residue perfectly represents the lights of the negative, which are the shades of the future picture. The plate is then placed in a gold bath and submitted to the action of electricity, which beautifully gilds the exposed parts of the surface with a layer of gold inseparable from the steel, and distributed of course to the minutest points unprotected by the fixed varnish. All that remains is to clean off the fixed varnish and subject the surface to the action of diluted acid, which has no effect upon the gilded parts, but etches the exposed surface of steel with a delicate exactness which no manual skill could imitate. The plate is now ready to give impressions with ink, although it will of course receive any desired additions or alterations at the hands of the engraver. The process is of inestimable value both to the investigation and diffusion of science, and with the aid of the microscope will introduce to common view many of the most instructive and curious *minutiae* of nature.

Colored prints are also obtained by a similar but shorter process, by Mr. Pouncey, of Dorchester, England. A similar sensitized coating mixed with oil color of any desired tint, is used on translucent paper, and when the portion protected from fixing by the dark parts of the negative has been washed off, the remainder, constituting the shades of the picture, is transferred as in lithography to any surface upon which it is to be impressed, or if ceramic colors are employed, it may be transferred to potter's "biscuit," and burnt in as a design upon any description of ware.

Mr. Osborn's method, for applying which on a large scale a company has been formed in this city, employs a sensitized coating of a preparation transferable to lithographic stone, and thus obtains an engraving for printing.

Our Cast Car Wheels.

It is often said that figures do not lie, but we cannot see with what reason it is said, for they certainly tell very different stories for some purposes than others. The *American Railroad Journal* finds statistics quite contradictory to those of the apostle of chilled wheels in England, from whom we quoted not long since. That paper estimates that not less than *ten thousand broken wheels* are taken out from under cars and engines on our roads in a year. The system of ringing every wheel with a hammer at the principal stopping places, as practiced generally on our railroads, detects the most of these fractures before they are completed; but no less than four serious accidents have occurred from this cause within the last winter. Deepening the chill and then annealing the center, may mitigate the evil, but nothing has yet done away the brittleness that comes of hardening, in cast iron. The majority of chilled wheels break in the tread, and probably always will. The very process involves actual cracking in many cases, and in still more an approach to cracking, in the form of a concealed over-tension which percussion in use will soon bring to fracture.

How to Buy Meat.

Dr. Letheby gives the following description of good and bad meats, with which his duties as sanitary officer in the city of London have required him to be very familiar:—Good meat is neither of a pale pinkish nor a deep purple tint. It has a marbled appearance, from a ramification of little veins of intercellular fat; and the fat of the internal organs especially is firm, hard and suety, and is never wet, whereas that of diseased meat is soft and watery. The feel of healthy meat is somewhat elastic, and hardly moistens the finger. Diseased meat is soft and wet. Good meat has but little odor, and this is not disagreeable; whereas diseased meat smells faint and cadaverous. Good meat bears cooking without much shrinking or losing much of its weight; but bad meat shrivels up and boils to pieces; this is due to the larger proportion of watery and gelatinous material, and the absence of fat and true muscular substance in the meat. Under the microscope the fiber should be clear and well defined, and free from infusorial animalculæ; while that of diseased meat is sodden and tumid, as if it had been soaked in water, the transverse streaks are indistinct and wide apart, and animalculæ abound in it.

ANOTHER PRESERVATIVE for animal substances, not very different from the *eau hemostatique* or blood-staying water, has been presented to the French Academy. It is composed of alum, benzine and water, and is said to cover the substance to be preserved with a sort of filtering cuticle, excluding the decomposing animalcules according to Pasteur, while admitting pure air and allowing free evaporation. That air has in itself no tendency to promote decay, accords with common experience, though not with the common impression. The butcher keeps his meat in a current of dry pure air, and a carcass hung up in the elevated atmosphere of some of our Rocky Mountain regions, will dry perfectly sweet and sound throughout, without other curing. Putting these facts and Pasteur's discovery together, is there not probably a practical principle which may be applied to the preservation of fruits and meats, and even of the human body, without the aid of a vacuum?