Sound Motors.

Mr. Edison's "motophone," in which the vibration of a telephone plate or "tympan" under the action of the voice is made to work a ratchet wheel round, anticipated the apparatus of Dr. Dvorák, of the University of Agram, in Croatia. Through the kindness of Mr. W. H. Preece, F.R.S., we have, says *Engineering*, seen a set of Dr. Dvorák's apparatus in action. The source of sound is a tuning fork kept in vibration by electro-magnetism and mounted on a resonance box. The open mouth of this box or chamber is the source of sound, and the sound mills are placed in front of it. One of these consists of a cluster of light glass balls suspended from a cross-shaped frame which is pivoted on a needle point. Each ball has a little nipple blown on its side, the nipple being pierced with a hole. The holes are on the same face of each ball round the cluster, that is to say, they all point in one way and receive the sound impulses one after another as the group of balls revolve, just like the sails of a windmill. The wall of the balls opposite the nipple, is, of course, entire, and the motion is due to the reaction on it. Another mill consists of four little stiff flags or plates of paper-like material pierced with holes, and suspended from four crossarms carried by a pivot as before. The holes are so pierced as to make small open nipples as before on a needle point. The holes are 0·6 centimeter apart. When placed before the resonating cavity, with the smaller ends of the nipple-like holes toward it, the card is repelled and attracted if the back of the card presenting the wider openings of the nipple is placed before the resonator. A similar mill is made with plane flags without holes, and the motion is intensified by placing between it and the cavity of the resonator a brass ball, or Helmholtz resonator, with open nipples at opposite diameters. These nipples are placed in line with the resonating cavity and the mill, the larger nipple being next the cavity. When a lighted paper or the hand is held behind the Helmholtz resonator, a distinct puff of wind is felt to issue from the nipple farthest from the resonator; and it is this puff of wind which, impinging on the vanes of the mill, causes it to rotate. A screen pierced with 100 conical holes may also be placed between the ball resonator and the mill in order to distribute the breeze. Another of Dr. Dvorák's rotators, also very interesting, is a flat cylindrical paper box, of glazed paper, having four projections on its sides, each carrying a short open tube of paper. It is a resonator with four openings, and, when suspended by a silk thread from a standard in front of the sounding box, begins to twirl round.

Stealing a Ride in England.

A man wishing to travel free from Wolverhampton, England, to Liverpool, procured two stout pieces of rope, which he fastened to the axles of a railway carriage, leaving a noose at the end of each. Into one noose he put his legs while he inserted his shoulders into the other. In this position he hung when the train started. The train was an express, and did not stop until Crewe was reached, which is about 70 miles from Liverpool. He was rather uncomfortable when the train began to move, but when it got into full swing he had real torture, and when he reached Crewe he was nearly dead with fright. Here he was taken into custody. To the magistrate who adjudicated on the case he explained that his sensations when swaying to and fro were something awful, and the effect of the sleepers as they rushed past him nearly robbed him of reason, and he "was afraid that every moment the rope would slip from his shoulders and hang him." The magistrate decided that he had had enough punishment, and, remarking that he was not likely to repeat the experiment, sent him about his business.

This must be a good deal worse than riding on a truck, which American tramps sometimes do.

Why Apprentices are Scarce.

A contemporary writer says it is principally because of the conceit of weak and foolish parents, who could not think of allowing their boys to soil their hands with manual labor, or tarnish their pedigree by associating with common workmen. Many and many a young man have I known whose aptitudes called to him with all the imperious demands of instinct to learn a trade, but he was prevented from doing so by his parents, who preferred to see him filling the more important and dignified position of clerk, often working fifteen hours a day for $15 per month, and sometimes yielding to the small temptation to leave unpaid his tailor's and washerwoman's bills. Or if he escaped the clerkship, he was almost sure to be found among the luckless ninety and nine professional men who stand off and eye with green envy the one in the round hundred who has made a success. It is not lack of attention to the new workman that is lowering the standard in mechanical trades, but the folly of parents in closing the doors of the trades in the face of their sons, and in the absence of good material we get bad. It is very often the case that we get hold of a boy who has but few or no qualifications, natural or acquired, for a trade, but he can probably make more money at that than at common labor, and as we can get no better, we have to do the best we can. There is no doubt but we are getting poorer subjects every year for apprentices for this very reason. But we can reach a point so low that it is impossible to go any lower, and I believe we have about reached that point in some lines of business. Some parents, and boys too, are at last getting their eyes opened. They are learning that they cannot plant dudes and raise men. Many bubbles have been pricked, and much gilding has worn through. Labor is becoming more dignified, because more than ever before is it wedded to thought. The manual training schools which are springing up in nearly all of our large cities are giving instruction to many boys whose parents, perhaps, would not at the start consent to them entering the shops. These schools are doing a good work in teaching the principles of trades, in fostering a genuine love for mechanics, and in pointing out the way to the special field where the young man can labor with the assurance of receiving his highest reward. With such brightening prospects as the work of the manual training school warrants, we see no reason for fearing that the race of good workmen in any trade will soon die out. On the contrary, we believe we will see mechanics increasing in numbers and skill from year to year.

IMPROVED HAND TRUCK.

In the invention herewith illustrated, recently patented by Mr. C. F. Stremel, Cresco, Iowa, a rod is pivoted to a standard secured to the upper cross bar of the truck. The free end of the rod is forked, and the ends of the prongs are bent down so as to form hooks. The pivoted end is flattened and provided with a series of apertures through either of which the pintle can be passed. This end projects beyond the pivotal point toward the handles of the truck, and serves as a handle by which the hooks can be disengaged from the package. When a bundle of barbed or other wire

STREMEL'S IMPROVED HAND TRUCK.

or any bundle is to be loaded on the truck, the forked end of the rod is raised, the truck is put in position for loading, and the forked end is then lowered on the bundle, holding it securely in place. By raising the forked end of the rod the bundle is released. The device can be adjusted to trucks of any common size, and can be attached or detached very quickly.

The Cable as It Is.

The cable system for passenger traffic as applicable to the streets in New York city is thus criticised in the Brooklyn *Union* by one of its correspondents, who evidently knows whereof he writes:

The so-called Rapid Transit Commission for the city of New York, while proposing an extended plan for new railways in its streets, seem to have assumed that the cable, or rope traction, is the method best adapted for street transit. As little appears to be known by the public of the operation of this system, it is important that it should be explained somewhat in detail. Its difficulties and objections are so apparent to any one investigating the Chicago cable railway, that with a full knowledge of them the citizens of New York would not consent to its adoption in their streets. Its most important feature is that of a rope running on permanent bearings under the ground, midway between each pair of rails or tracks. Movement is given to this rope by engines located adjacent to the tracks, by means of large cylinders or drums connected with them, around which one end of the loop of wire rope passes, the rope being continuous, and the other end a loop, passing around a similar cylinder at the outer end of the roadway. Be it any number of miles in length, the rope must be endless. Between these two extremes and around the cylinders the rope is in constant motion at a speed fixed at the engines. It may be three or six miles per hour, but cannot be moderated or increased between any two cylinders; it must be constant at the speed given at the cylinder near the engines. It cannot be graduated to the variations of speed in street traffic.

Movement is communicated to the cars by what is called a grip, which is an iron bar depending from a grip car, so called, placed in advance of and to which are attached the passenger cars. This iron bar or grip rod is in contact with the cable constantly. The rope passes through a loop or ring in the lower end of the grip rod loosely, when cars are at rest, but movement is given to them by tightening the grip around the rope, when they instantly acquire its velocity. When a stop is desired the grip is released, the brakes are put on, and momentum checked.

It will readily be seen that a rigid system operated from a remote center involves insuperable difficulties for the ever varying conditions of street traffic. When the rope breaks or is thrown out of its bearings, the movement of cars is suspended—which has often occurred in Chicago—and cannot be released until the rope can be repaired or spliced, often requiring several hours, stopping not only a single car, as by other systems, but all between any two cylinders—it may be 10 or 100 cars, and it may be through any number of miles. All the cars moving in either direction in that circuit are compelled to stop until the rope is repaired, or be moved by horses, to which the Chicago road has often been obliged to resort. This difficulty prevents the continuity of service which is indispensable for any of the streets of this city.

The crossing of other tracks is not accomplished successfully at Chicago, as the grip must for the time be released to pass the intervening obstruction, and its connection again becomes uncertain, and involves risk, as momentum must be sustained, and cannot be checked suddenly should some obstacle come in its way.

The grip rod connects with the rope through an open slotway, which must be continuous through the center length of the road, between each pair of tracks. This slotway is a permanent opening, five-eighths inch wide in the Chicago road, which has proved just wide enough to let in the calk of a horse's shoe and results in violently tearing off the shoe and injures the hoof and ankle, this having often occurred. The construction of this system of road places a series of contingencies in the center of traffic which are constant and liable to interrupt business upon the streets, besides destroying all continuity of service on the road itself; all being governed by a fixed movement remote from the car, but holding it firmly in its grasp, and forcing all the traffic of the street to its rigid laws. Collisions are of frequent occurrence, and unavoidable with a system which cannot be graduated to street travel, and which can only move at all by a sudden change from a full stop to the speed of the cable; be it three miles or six miles an hour, a jerk is inevitable.

While the operation of the system is subject to many difficulties not enumerated, its method of construction is a serious consideration. In Chicago trenches have been dug four or five feet deep, which occupy the space between each pair of tracks; they are lined with concrete, made of broken stone and cement, in which trenches the iron frames and wheels are fixed on which the rope moves. These trenches or sewers are permanent, have manholes at intervals, and are accessible for repairs, and are always open through the slotway to the street surface, and many men are constantly engaged in removing the substances which fall through the slotway, which are taken out through the manholes referred to. This space may perhaps be spared for such uses in a street as wide as State Street, Chicago, but is entirely impracticable on the narrow streets of New York or Brooklyn, now so largely occupied with underground complications.

It is pertinent to inquire whether rapid transit is possible by such a system on our streets. The legal and the safe limit of speed on the surface is six miles per hour. It is clear that the rope traction system cannot maintain this average as even as the horse cars can. The frequent full stops and the impossibility of accelerating speed after such delays will render the average much below that. At a rate of speed above six miles its momentum rapidly increases and becomes more difficult of control—in fact, has proved an element of great danger. In Chicago fourteen persons have been killed by the system in one year, as shown by the admission of the president of the Chicago cable road.

It is evident that the rope traction system for street railways is uncertain in its operation; that it cannot be relied upon for constant service; that it cannot graduate its speed to the requirements of street traffic; and that it is extremely unsafe unless the portion of the street occupied by its tracks is given up to its use, and other streets at its crossing compelled to yield to its movements.

It is to be hoped that no construction of this system will be allowed in our city without a thorough investigation of existing facts, which will certainly prevent the consummation of any plans for the adoption of rope traction by any system yet known, with the consent of the public authorities.

The Patent Office Surplus.

A correspondent suggests that the surplus revenue of the Patent Office be employed to furnish inventors with free subscriptions to the *Official Gazette;* the writer being under the erroneous impression that the Commissioner of Patents is puzzled to know how to dispose of the accumulation of money. The truth is that the Commissioner has no power to expend a dime more than Congress directs in its annual appropriations; and the Legislature has reduced the clerical force of the Patent Office so greatly that the Commissioner is unable to transact some of the ordinary business of the office with proper dispatch. This hostile legislation is doubtless intended like other Congressional bills to damage and annoy inventors, and manufacturers who hold patents. How long the latter will permit themselves to be made the sport of the politicians remains to be seen.

An Onion Disease.

Since parasites do infest everything organic, we are not surprised to read in the *Rev. Scientifique*, January 5, 1884, that M. Joannes Chatin has found a parasite in the common onion that gives rise to disease. M. Pasteur, who has examined it, finds it similar to the parasite of mildew in wheat, but with less vitality. The affected plants, it is said, should be pulled up and burned.

PATENT applied for: Cheap burglar alarm.—Drive a headless nail into the casing over any door, and after closing the door hang a tin pan on the nail when you go to bed. That is to say, do all this if you are naturally timid and want a cheap burglar alarm that will work every time.—*Detroit News.*