

**IMPROVED VEHICLE AXLE.**

We give an engraving of a novel vehicle axle recently patented by Mr. Edwin Firth, of Providence, R. I. The spindle, A, is provided at its outer end with a revolving pin, C. The end of the spindle has a recess to receive a sleeve in which the pin, C, is journaled, and is provided at its inner end with a flange to hold it in place. The sleeve is screwed in the end of the spindle, and retained permanently in the recess by a pin, D, driven transversely through a groove in the end of the spindle and the wall of the sleeve.

The pin, C, adjoining the end of the spindle is provided with a square enlargement or nut having its outer end rounded and screw threaded. The axle box is secured in the usual manner in the hub. The inner end of the spindle has a flanged collar to receive the inner end of the axle box, between which and said collar there is a washer of leather to prevent sand and grit from entering the bearing. The outer end of the axle box has a transverse pin, E, which, when the hub is adjusted upon the spindle, bears against one of the sides of the nut or enlargement upon the revolving pin, C. It will thus be seen that when the wheel revolves, the pin, C, is caused to revolve at the same rate of speed. The end of the axle box is threaded to receive the lubricating cap or nut, B, which is provided with a diaphragm, having an opening which is screw threaded to receive the end of the revolving pin, C, and provided with grooves, through which the lubricant may pass from the chambered nut or cap, B, to the bearing. This cap has a plug, which is removed when lubricating material is to be supplied to the cap.

The nut or cap which serves to secure the wheel upon the spindle revolves with the wheel, and at the same rate of speed, as though it formed an integral part thereof. By this means the necessity of making right and left hand threads, according to the direction of revolution, is avoided, thus simplifying the manufacture and lessening the expense of production. It is impossible for the nut or cap to come off by ordinary usage. When the nut is screwed into position, it makes a liquid-tight joint at the outer end between the axle-box and spindle, completely covering the end of the latter, and making it impossible for sand and grit to enter the bearing. The nut or enlargement upon the pin, C, as it revolves, creates a vacuum, by which the oil is drawn out of the chambered nut and supplied to the bearing rapidly or slowly, according to the speed of revolution. No oil can be lost or wasted, since it must of necessity pass direct to the bearing.

This improvement is of great service in taking up slack caused by wear upon the spindle. The cap or nut, B, when adjusted, engages threads upon the axle box, and also upon the revolving pin, which forms an integral permanent part of the spindle. The wheel or the axle-box is thus held in a certain position in relation to the spindle. If in this position it becomes loose or slack, it is only necessary to unscrew the nut from the end of the axle box, forcing the latter upon the spindle until tight, and again adjusting the nut, which must then, before it takes with the thread upon the end of the axle box, be screwed down upon the pin, C, a sufficient distance to compensate for the wear.

For further information address Mr. Edwin Firth, 118 Grove St., Providence, R. I.

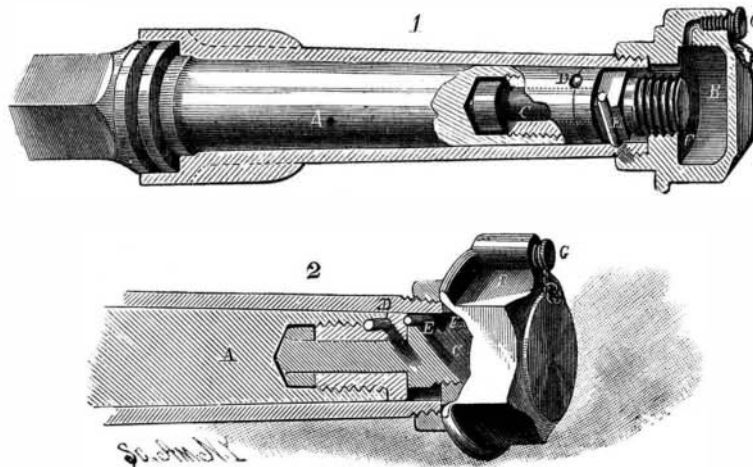
**A New Cattle Disease.**

At a recent meeting of the Southern Counties Veterinary Medical Association, held at London, England, Mr. G. Fleming, Army Veterinary Inspector, read a paper on a new disease which he had discovered to prevail extensively, chiefly among cattle, in England, and the nature of which has until now been hidden in obscurity. It manifests itself by great enlargement and induration, as well as ulceration of the tongue. It also attacks the bones of the face and jaws, appears inside and outside the throat in the form of tumors, and is very destructive, especially among young stock. Mr. Fleming, by means of morbid specimens from the tongues and heads of calves, as well as by microscopical preparations, clearly demonstrated the affection to be due to the presence of a minute fungus, which probably obtains an entrance to the tissues either through the mucous follicles or an abrasion in the mouth. From the peculiar manner in which the fungus grows, and the radiating arrangement of its branches, it has received the name of *Actinomyces*, and it is consequently proposed to designate the disease *Actinomyces*. It has hitherto only been noticed in Germany and Italy, and no fewer than sixteen cases are reported in the German medical journals as having been observed in man.

Mr. Fleming produced some evidence to show that the fungus could be successfully implanted from a diseased to a healthy animal; and one of the German cases, in which a man was affected, would lead to the suspicion that it may be communicated from the lower animals to our own species. Instances were given in which the microphyte had also been found in pigs, goats, a horse, and a dog.

**Drifts and Tunnels.**

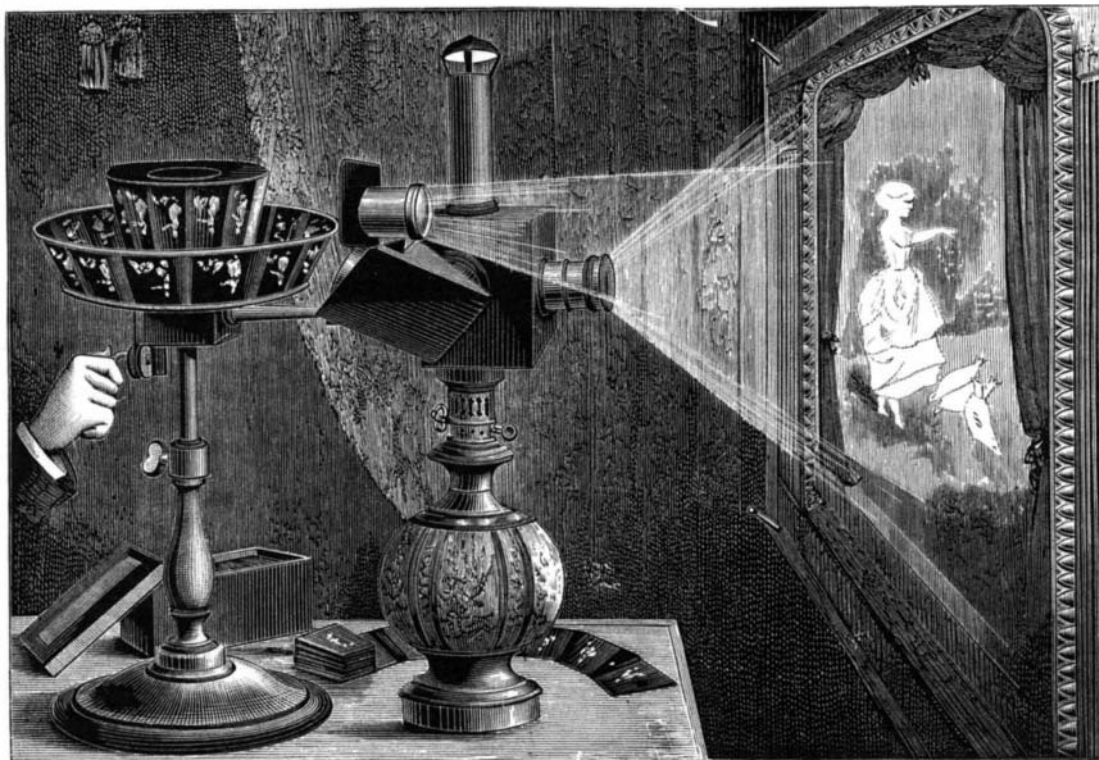
These two terms are in common use in mining reports, but are not always correctly used or rightly understood. A drift is a tunnel, but a tunnel is not always a drift. Of the two sorts of mining tunnels, the drift and the cross cut, the former always follows or is intended to follow the vein.

**FIRTH'S VEHICLE AXLE.**

When the vein is missed by following a wrong lead, a cross-cut may be necessary to find it again. This is legitimate, but not all cross cuts can be so described. Too frequently, as the *Mining Record* points out, the main object of the cross cut seems to be to eat the treasury stock and "down" mining companies. This operation, our contemporary says, has cost Hillsdale County (Colorado) about \$5,000,000 in the past five years. "The cross cut in mining is frequently inevitable, but the mining company that undertakes to determine the value of a prospect by a cross cut tunnel costing from one to thirty thousand dollars is"—not wise.

**THE PROJECTING PRAXINOSCOPE.**

We have already made known to our readers an optical apparatus constructed by Mr. Reynaud, the "Praxinoscope," which produces with remarkable clearness, by reflection, an animated illusion in the center of a prism of plane mirrors of the successive poses of a person in motion. We have also shown how, in the "Theater Praxinoscope," such illusion is rendered complete by an ingenious arrangement which allows the animated object to appear on an appropriate ground or scene.

**REYNAUD'S NEW PROJECTING PRAXINOSCOPE.**

The recent remarkable experiments in instantaneous photography, which have permitted the different attitudes of man and animals being caught and fixed, seem to us to give a special interest to this sort of researches, and to consequently call attention to apparatus that allow of such attitudes being brought together after they have been fixed, so as to make a synthesis of them, so to speak, and to thus reproduce the action of life itself.

Such is the purpose of the new instrument that we here-with figure—the "Projecting Praxinoscope"—by means

of which the images obtained are projected upon a screen so as to be visible to the entire audience.

By a modification of the lampscope Mr. Reynaud obtains, with the aid of an ordinary lamp, both a projection of the scene (through the objective seen at the side of the lantern) and a projection of the animated object through an objective seen in front and a little above the lantern. To effect this, the poses or phases that form an object are drawn and colored on glass, and united into a band by connecting pieces of cloth. One of these flexible bands is placed in the flaring crown of the instrument, which latter contains apertures that correspond with the poses of the object.

To understand the direction taken by the luminous rays, we must imagine a condensing lens, which, being near the flame of the lamp is not visible in the figure, and also a plane mirror inclined at an angle of 45°, which reflects the luminous fascicle and causes it to traverse the pictures behind the apertures in the crown. This luminous fascicle, which is again reflected by the facets of the prism of mirrors, finally enters the objective, and the latter transforms the central virtual image into a real and enlarged one on the screen.

By making the two parts of the apparatus converge slightly, the animated object is brought into the middle of the scene, where it then seems to undergo its motions as if endowed with life.

A moderate and regular motion is communicated to the instrument by means of a small winch affixed to the support. This apparatus furnishes with an ordinary moderator lamp pictures that are well lighted and that have a very curious effect. It will, then, allow of animated projections being obtained without the aid of a special

luminous source, simply by the use of a common, every-day lamp.—*La Nature*.

**An Asphalt Mortar.**

The *Centralblatt der Bauverwaltung* describes a patented composition made at a factory in Stargard, Pomerania, which has for some years past been used with perfect success on the Berlin-Stettin railway for wall copings, water tables, and similar purposes requiring a waterproof coating. The material is composed of coal tar, to which are added clay, asphalt, resin, litharge, and sand. It is, in short, a kind of artificial asphalt, with the distinction that it is applied cold, like ordinary cement rendering. The tenacity of the material when properly laid, and its freedom from liability to damage by the weather, are proved by reference to an example in the coping of a retaining wall which has been exposed for four years to the drainage of a slope 33 feet high. This coping is still perfectly sound, and has not required any repair since it was laid down. Other works have proved equally satisfactory. In applying this mortar, as it is termed, the space to be covered is first thoroughly dried, and after being well cleaned is primed with hot roofing varnish, the basis of which is also tar. The mortar is then laid on cold to the

thickness of about three-eighths of an inch, with either wood or steel trowels, and is properly smoothed over. If the area covered is large, another coating of varnish is applied, and rough sand strewn over the whole. The waterproof surface thus made is perfectly impregnable to rain or frost, and practically indestructible. The cost of the material laid is estimated at not more than 5d. per square foot; and it is stated that this price can be reduced by at least 1d. for large quantities put down by experienced workmen.

**How Hogs Prevent the Renewal of Pine Forests.**

A correspondent writing from Johnsonville, S. C., incidentally mentions a curious instance of the influence of animals in controlling or preventing forest growths. It appears that the fondness of hogs for the juicy roots of young pines leads them to seek them assiduously, so that where hogs are allowed to roam in that region one can hardly find a young long-leaved pine in a thousand acres of pine forest.

There being no young trees to take the place of the old ones used up by the lumbermen and turpentine gatherers, that species of pine timber is rapidly being exterminated.

A FRENCH chemist claims to have discovered a method of overcoming the danger threatening vineyards from the ravages of the phylloxera. His process is to inoculate the vines with the phenol poison. The phylloxera do not attack plants thus treated, and are extirpated for want of food. The vines are in no way injured by the inoculation process.