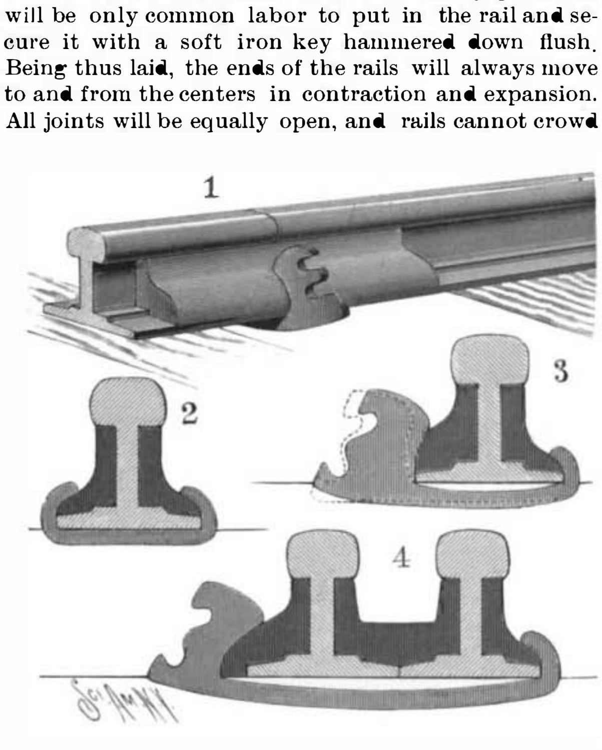
High Kite Flying.

The highest recorded altitude ever reached by a kite was obtained on the afternoon of September 20, at the Blue Hill Observatory. The top kite reached the height of 10,016 feet above sea level, or 8,386 feet above the summit of the hill. The ascent began at noon, and the highest point was reached at seventeen minutes past four, when seven Hargrave kites were held by nearly four miles of wire. An instrument for recording the temperature, humidity and pressure was hung about 130 feet below the highest kite. At the highest point reached the temperature was 38 degrees, while at the ground it was 63 degrees. At the height of 4,000 feet the humidity rose rapidly; at 7,000 feet the humidity was almost at the point of saturation; at 8,000 feet it began to fall, and at the highest point it was extremely low. At the ground level the humidity remained low during the entire ascent. The instruments and kites were brought down at 6:40 P. M., having been more than a mile above the hills for over five hours.

IMPROVED RAILS AND RAIL FASTENINGS.

The accompanying engraving illustrates some improvements in railway rails, fish plates, and means for holding them to the rails, which form the subject of a patent issued to James Johnston, of No. 13 Public Square, Bradford, Pa. The use of these rails involves certain changes from the ordinary method of track making, the rails being anchored to the roadbed by their middles. They are held in line by track spikes, and the fish plates are designed to prevent up and down play at the ends of the rails, having no other function. The rail and fish plates are shaped to correspond with one another for this purpose, and the rail is further altered on the margin of its flange for the purpose of making a solid guard rail combination. The inventor claims that with this construction the track will not creep, and the rails will not be subject to the usual principal causes of breakage, as there will be an absence of pounding and clicking at joints, and greater safety in guard rails—all to be had without increased expense, as what is spent on anchors and milled rails will be made up in saving of fish plates, nuts, bolts and labor. Fig. 1 represents the rails tied together by the fish plates and clamps, Figs. 2 and 3 being sectional views, and Fig. 4 representing a section through the guard rails, showing the spacing block and fish plates employed. The fixing of the anchors in the roadbed must be done with absolute accuracy. If thirty foot rails are to be used, and it is expected that they will expand one-fourth of an inch under highest temperature met with, then the anchors will be placed at thirty foot, one-fourth inch centers apart. In ordinary situations a good tie will be a sufficient foundation for an anchor, but on grades, side hills, or other difficult situations, other security, such as piles, drive pipe, crib work, or masonry, must be provided. The rails will be made with an indentation in the flange, in the exact center, so that after the anchors are once correctly placed, it will be only common labor to put in the rail and secure it with a soft iron key hammered down flush. Being thus laid, the ends of the rails will always move to and from the centers in contraction and expansion. All joints will be equally open, and rails cannot crowd one another; in fact, they should never quite touch. In the design of the rail on section the ordinary pattern is followed, but it is made heavier by the addition of ribs to make the web square with the head and flange, and the outer margin of the flange is raised and made heavier in order that rails placed side by side for guards may have a bearing against one another. The rail is preferably finished in a milling machine, in order to obtain true angles and surfaces, and the band or clamp with which the fish plates are held in place will cost little compared with the cost of bolts, nuts, and nut locks ordinarily used. These combinations are all secured in place by bands, which are passed under the rail and turned up on both sides, and should any of these details fail, or appear to be insufficient at any time, the ordinary methods now employed may still be used.



JOHNSTON'S RAILWAY RAILS AND RAIL FASTENINGS.

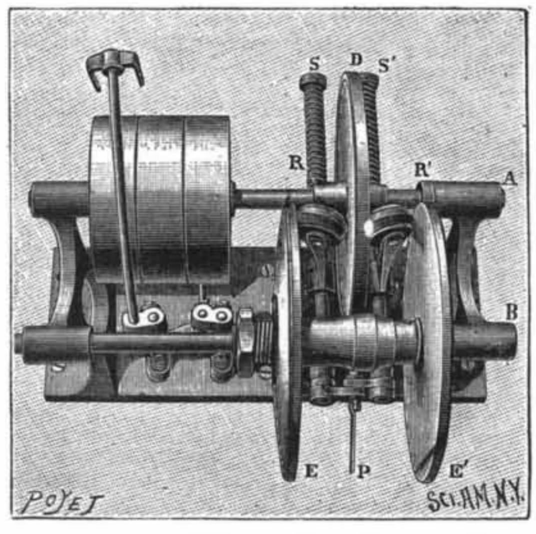


Fig. 2.—THE OSGOOD FRICTION CLUTCH.

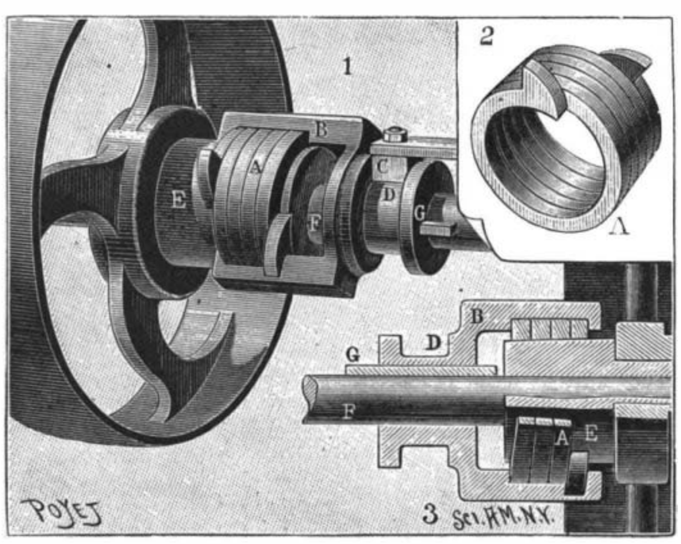


Fig. 1.—THE LINDSAY SPIRAL COUPLING CLUTCH.

MECHANICAL POWER TRANSMISSIONS.

We have recently had an opportunity of studying two new systems of transmission, about which we shall say a few words.

The first of these (represented in Fig. 1) is a Lindsay coupling clutch. The pulley that it is desired to set in motion is keyed upon a cone, E, which is solid, provided with bearings and loose upon the shaft, F. Upon this cone there slides another and elastic one, A (No. 2), consisting of a steel spiral which is provided with lugs at its extremity. The number of spirals and the section vary according to the power to be transmitted. The arms of a balanced piece, B, abut against the lugs, and the piece is provided with two tappets that are in contact with the spiral, and also with a groove, D, in which moves a slide, C, that may be maneuvered from a distance by means of a lever. The piece, B, is fixed to the shaft, F, by means of a key, G. In order to throw things into gear, it suffices to push forward the block, C, when the piece, B, will also be moved forward and carry along the spiral, A, which will slide freely and bear against the cone, E, and set it in motion. It will be seen that it is possible to easily graduate the setting in motion through a maneuvering of the lever; and that it is also possible to cause the elastic cone to move forward upon the solid one as slowly as may be desired. It is possible, too, to limit the power transmitted by not shoving the elastic cone home. It is, in fact, only when the latter is perfectly in gear that the full power for which it is calculated is transmitted. The throwing out of gear is done very easily by a contrary maneuver. Let us add that the two cones should always be lubricated. In order to protect it from dust, and for various other reasons, the elastic cone is inclosed in a tight cast iron box. The transmission may be reversed according to circumstances. Upon one extremity of the driving shaft is keyed the cast iron cone, and upon this is placed the elastic one. In this case the solid cone revolves freely in the interior of the other when the driving shaft is in motion. These couplings are constructed in two sizes, one of which permits of operating at all angular velocities up to 2,000 revolutions a minute, while the other is adapted for heavy motions and revolutions of feeble angular velocity. These apparatus have the advantage of throwing into gear progressively, without any shock and at all angular velocities. The throwing out of gear is just as easy, and is instantaneous and complete.

Let us point out another possible utilization. As the elastic cone is provided with lugs, the motion may be transmitted in opposite directions to the shafting to be driven, when the driving shaft is actuated in one direction or the other. Supposing that we have two motors actuating one shaft in common through pulleys provided with couplings having a double motion, it will be possible to render regular the running of these two motors one by the other. The coupling may also be so arranged as to prevent one motor from carrying along the other.

Sometimes it is necessary to have transmissions of variable velocity. Fig. 2 shows us the principal arrangements of the Osgood system. A shaft, A, which receives motion from the pulleys to the left, carries a disk, D, to the left and right of which are placed two friction rollers, R and R', that present bevel faces at their rims. These rollers may be easily shifted by tightening the springs, S and S', more or less by means of the rod, P. At the sides of the rollers are arranged two other disks, E and E', that actuate the same shaft, B, that transmits the motion. The rollers, R and R', rub through one of their faces against the disk, D, and through the other face against each of the disks, E and E'. These latter are therefore set in motion, but with a much greater angular velocity, and one that varies according to the position occupied by the rollers. The velocity is maximum when the rollers are in the center and minimum when they are at the periphery.—La Nature.

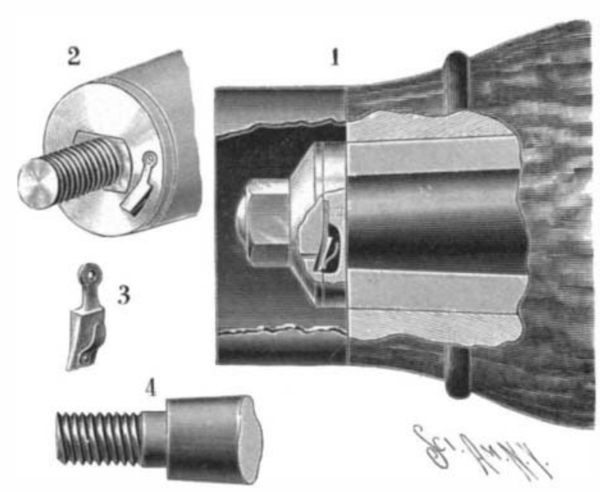
A Lesson in Economy.

Consul Germain writes from Zurich, in regard to a plan recently introduced in the public schools of several European cities. In Brussels, the children attending public schools were requested by their teachers to gather up, on their way to and from the school, all such apparently valueless objects as old metallic bottle capsules, tin foil, tin cans, paint tubes, refuse metals, etc., and deliver their collections daily to their respective teachers.

In the period from January 1 to October 1, 1895, or within eight months, the following amounts were collected: Tin foil, 875 kilogrammes (1,925 pounds); old paint tubes, 100 kilogrammes (220 pounds); bottle capsules, 2,007 kilogrammes (4,415 pounds); scraps of metal, 555 kilogrammes (1,221 pounds); total, 3,537 kilogrammes (7,781 pounds). This apparent rubbish was disposed of and the proceeds applied so as to completely clothe 500 poor children and send 90 sick ones to recuperation colonies, and there still remained quite a balance, which was distributed among the poor sick of the city.

A VEHICLE AXLE IMPROVEMENT.

The construction shown herewith, which forms the subject of a patent recently issued to Simon J. Harry, of Washington, D. C., affords novel means for preventing the cap nut from turning. Fig. 1 illustrates the application of the improvement, portions of the hub being broken away. The axle, spindle and box may be of ordinary pattern, but the outer end of the spindle is threaded, as shown in Fig. 4, and has a seat for a collar with central opening squared on two sides, as shown in Fig. 2, where the collar is represented in place, having on its outer face a spring pawl. The pawl, shown in Fig. 3, fits in a suitable recess in the face of the collar, and its point projects to engage a shoulder forming the end wall of a recess in the inner end of the cap nut, locking the latter from accidentally turning off by jarring or the backing of the vehicle. To release the pawl, a slender rod, nail or other suitable implement may be passed through an opening in the nut, by which the point of the pawl may be pressed back and the nut released.



HARRY'S HUB ATTACHING DEVICE.